

# **SATA RAID Cards**

## **ARC-1110/1120/1130/1160/1170**

( 4/8/12/16/24-port PCI-X SATA RAID Controllers )

## **ARC-1110ML/1120ML/1130ML/1160ML**

( 4/8/12/16-port PCI-X SATA RAID Controllers )

## **ARC-1210/1220/1230/1260**

( 4/8/12/16-port PCI-Express SATA RAID Controllers )

# **USER Manual**

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# **INTRODUCTION**

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## **1. Introduction**

This section briefly describes general overview of SATA RAID Series controller card, ARC-1110/1120/1130/1160/1170 (4/8/12/16/24-port PCI-X SATA RAID Controller) and ARC-1210/1220/1230/1260/1270 (4/8/12/16/24-port PCI-Express SATA RAID Controller).

### **1.1 Overview**

ARC-11xx/12xx Series high-performance PCI bus Card Serial ATA RAID controller supported 4, 8, 12, 16, 24 SATA-II peripheral device on a single controller. With properly configured, SATA controller can provided non-stop services with a high degree of fault tolerance through the use of RAID technology and advanced array management features. The 4/8 port SATA RAID controller is a low-profile PCI cards-Ideal for 1U or 2U rack-mount system. It has the same RAID kernel of its field-proven external RAID controller. Lets bring quickly to stable and reliable RAID controller to the market.

### **Unparalleled Performance**

The array controllers provide reliable data protection for desktops, workstations and servers. They raise the standard higher performance levels with several enhancements including Intel high-performance I/O Processor, a new DDR memory architecture (DDR333) and high performance PCI bus interconnection. SATA RAID 8/12/16/24-port controller with Areca RAID 6 engine build-in can offer extreme performance RAID 6 function. It can concurrently compute two parity blocks and performance very similar to RAID 5. The controllers default support 128MB ECC DDR333 SDRAM memory. The 12/16/24 ports controllers support one SODIMM socket for upgrading up to 1GB. The controllers use the Marvell 4/8 channels SATA PCI-X controller chip, which can simultaneously communicate with the host system, and read or write data on several drives.

### **Unsurpassed Data Availability**

As storage capacities continue to rapidly increase, user needs greater level of disk drive fault tolerance, which can be implemented without

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doubling the investment in disk drives. RAID 1 can provide greater fault tolerance, but needs double disk drives and is too costly for most users to implement on large volume sets. User wants protection of RAID 1 or better with an implementation cost comparable to RAID 5. The RAID 6 can offer fault tolerance greater than RAID 1 or RAID 5 but only consumes capacity of 2 disk drives for distributed parity data. The 8/12/16/24-port RAID controllers provide the highest RAID 6 feature to meet above requirements.

The 4/8/12/16/24-port controllers also provide RAID levels 0, 1, (10), 3, 5, and JBOD RAID configurations. Its high data availability and protection derives from the following capabilities: Online RAID Capacity Expansion, Array Roaming, Online RAID Level / Stripe Size Migration, Dynamic Volume Set Expansion, Global Online Spare, Automatic Drive Failure Detection, Automatic Failed Drive Rebuilding, Disk Hot-Swap, Online Background Rebuilding and Instant Availability/Background Initialization.

During the controller firmware upgrade flash process, it is possible for a problem to occur resulting in corruption of the controller firmware. With our Redundant Flash image feature the controller will revert back to the last known version of firmware and continue operating. This reduces the risk of system failure due to firmware crash.

## Easy RAID Management

SATA RAID controller build-in firmware with an embedded terminal emulation that can access via hot key at BIOS boot-up screen. This pre-boot manager utility can be used to simplify the setup and management of RAID controller. The controller firmware also contains HTTP browser-based program that can access through the drive ArchHttp Proxy Server function in Windows, Linux and FreeBSD environment. The Web browser-based RAID management allows local and remote to create and modify RAID set, volume set, and monitor RAID status from standard web browser.

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## **1.2 Features**

### **Adapter Architecture**

- Intel IOP 80331 I/O processor (ARC-11xx series)
- Intel IOP 80332/IOP80333 I/O processor (ARC-12xx series)
- 64-bit/133MHz PCI-X Bus compatible
- PCI Express X8 compatible
- 128MB DDR333 SDRAM with ECC protection
- One SO-DIMM Socket support DDR333 SDRAM with ECC protection, upgrade to 1GB
- An ECC or non-ECC SDRAM module using X8 or X16 devices
- Support up to 4/8/12/16/24 SATA II drives
- Write-through or write-back cache support
- Multi-adapter support for large storage requirements
- BIOS boot support for greater fault tolerance
- BIOS PnP (plug and play) and BBS (BIOS boot specification) support
- Areca or Intel R6 supports extreme performance RAID 6 function
- NVRAM for RAID event & transaction log
- Battery backup module (BBM) ready (Depend on M/B)

### **RAID Features**

- RAID level 0, 1, (10), 3, 5, 6 (R6 engine inside) and JBOD
- Multiple RAID selection
- Online Array roaming
- Online RAID level/stripe size migration
- Online capacity expansion volume growth and RAID level migration simultaneously
- Instant availability and background initialization
- Automatic drive insertion / removal detection and rebuilding
- Greater than 2TB per volume set for 64-bit LBA
- Redundant flash image for adapter availability
- Support S.M.A.R.T. NCQ and OOB Staggered Spin-up Capable drives

### **Monitors/Notification**

- System status indication through LED/LCD connector, HDD activity/fault connector, and alarm buzzer
- SMTP support for email notification
- SNMP support for remote notification
- I2C Enclosure Management Ready

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## **RAID Management**

- Field-upgradeable firmware in flash ROM
- Ethernet port support on 12/16/24-port

## **In-Band Manager**

- Hot key boot-up McBIOS RAID manager via BIOS
- Support controller's API library for customer to write its own AP
- Support Command Line Interface (CLI)
- Browser-based management utility via ArchHttp Proxy Server
- Single Admin Portal (SAP) monitor utility
- Disk Stress Test (DST) utility for production in Windows

## **Out-of-Band Manager**

- Firmware-embedded Browser-based RAID manager, SMTP manager, SNMP agent, and Telnet function via Ethernet port (for 12/16/24 port Adapter)
- Support controller's API library for customer to write its own AP(for 12/16/24 port Adapter)
- Push Button and LCD display panel

## **Operating System**

- Windows 2000/XP/Server 2003
- Red Hat Linux
- SuSE Linux
- FreeBSD

(For latest supported OS listing visit <http://www.areca.com.tw>)

Internal PCI-X RAID Card Comparison (ARC-XXXX)					
	1110	1120	1130	1160	1170
Host Bus Type	PCI-X 133MHz				
RAID 6 support	N/A	YES	YES	YES	YES
Cache Memory	128MB	128MB	One SO-DIMM	One SO-DIMM	One SO-DIMM
Drive Support	4 * SATA II	8 * SATA II	12 * SATA II	16 * SATA II	24 * SATA II
Disk Connector	SATA	SATA	SATA	SATA	SATA

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Internal PCI-X RAID Card Comparison (ARC-XXXXML)				
	1110ML	1120ML	1130ML	1160ML
Host Bus Type	PCI-X 133MHz			
RAID 6 support	N/A	YES	YES	YES
Cache Memory	128MB	128MB	One SODIMM	One SODIMM
Drive Support	4 * SATA II	8 * SATA II	12 * SATA II	16 * SATA II
Disk Connector	SATA/Multi-lane	SATA/Multi-lane	SATA/Multi-lane	SATA/Multi-lane

Internal PCI-Express RAID Card Comparison (ARC-XXXX)				
	1210	1220	1230	1260
Host Bus Type	PCI-Express X8			
RAID 6 support	N/A	YES	YES	YES
Cache Memory	128MB	128MB	One SODIMM	One SODIMM
Drive Support	4 * SATA II	8 * SATA II	12 * SATA II	16 * SATA II
Disk Connector	SATA	SATA	SATA	SATA

## 1.3 RAID Concept

### 1.3.1 RAID Set

A Raid Set is a group of disk containing one or more volume sets. It has the following features in the SATA RAID controller. A volume Set must be created either on an existing raid set or on a group of available individual disks (disks that are not yet a part of an raid set). If there are pre-existing raid sets with available capacity and enough disks for specified RAID level desired, then the volume set will be created in the existing raid set of the user's choice. If physical disk of different capacity are grouped together in a raid set, then the capacity of the smallest disk will become the effective capacity of all the disks in the raid set.

### 1.3.2 Volume Set

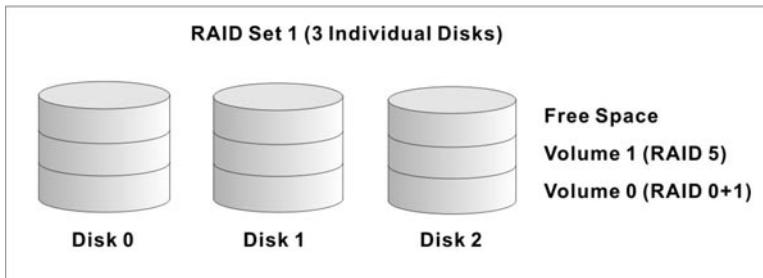
A Volume Set is seen by the host system as a single logical device. It is organized in a RAID level with one or more physical disks. RAID level refers to the level of data performance and protection of a Volume Set. A Volume Set capacity can consume all or a portion

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of disk capacity available in a RAID Set. Multiple Volume Sets can exist on a group of disks in a Raid Set.

In the illustration below, Volume 1 can be assigned a RAID 5 level of operation while Volume 0 might be assigned a RAID (10) level of operation.



## 1.3.3 Easy of Use Features

### 1.3.3.1 Instant Availability/Background Initialization

RAID 0 and RAID 1 volume set can be used immediately after the creation. But the RAID 3 and 5 volume sets must be initialized to generate the parity. In the Normal Initialization, the initialization proceeds as a background task, the volume set is fully accessible for system reads and writes. The operating system can instantly access to the newly created arrays without requiring a reboot and waiting the initialization complete. Furthermore, the RAID volume set is also protected against a single disk failure while initializing. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.

### 1.3.3.2 Array Roaming

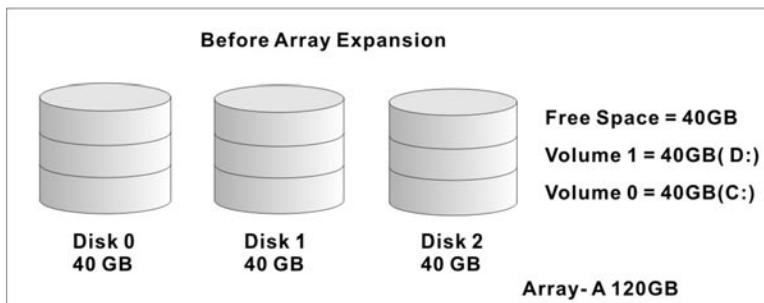
The SATA RAID controller stores configuration information both in NVRAM and on the disk drives. It can protect the configuration settings in the case of a disk drive or controller failure. Array roaming allows the administrators the ability to move a completely raid set to another system without losing RAID configuration and data on that raid set. If a server fails to work, the raid set disk drives can be moved to another server and inserted in any order.

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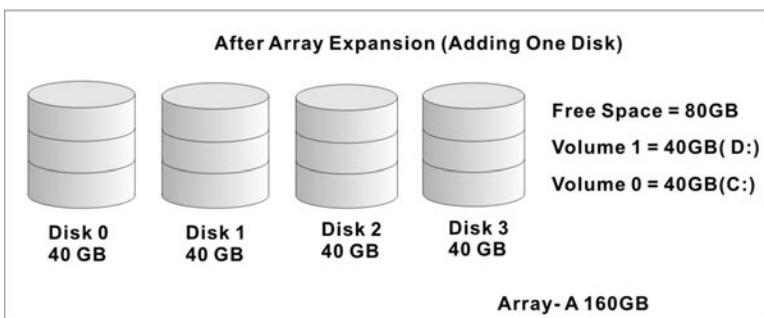
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## 1.3.3.3 Online Capacity Expansion

Online Capacity Expansion makes it possible to add one or more physical drive to a volume set, while the server is in operation, eliminating the need to store and restore after reconfigured the raid set. When disks are added to a raid set, unused capacity is added to the end of the raid set. Data on the existing volume sets residing on that raid set is redistributed evenly across all the disks. A contiguous block of unused capacity is made available on the raid set. The unused capacity can create additional volume set. The expansion process is illustrated as following figure.



The SATA RAID controller redistributes the original volume set over the original and newly added disks, using the same fault-tolerance configuration. The unused capacity on the expand raid set can then be used to create an additional volume sets, with a different fault tolerance setting if user need to change.



## 1.3.4 Online RAID Level and Stripe Size Migration

User can migrate both the RAID level and stripe size of an existing volume set, while the server is online and the volume set is in use. Online RAID level/stripe size migration can prove helpful during performance tuning activities as well as in the event that additional physical disks are added to the SATA RAID controller. For example, in a system using two drives in RAID level 1, you could add capacity and retain fault tolerance by adding one drive. With the addition of third disk, you have the option of adding this disk to your existing RAID logical drive and migrating from RAID level 1 to 5. The result would be parity fault tolerance and double the available capacity without taking the system off.

## 1.4 High availability

### 1.4.1 Creating Hot Spares

A hot spare drive is an unused online available drive, which is ready for replacing the failure disk drive. In a RAID level 1, (10), 3, or 5 raid set, any unused online available drive installed but not belonging to a raid set can define as a hot spare drive. Hot spares permit you to replace failed drives without powering down the system. When SATA RAID controller detects a SATA drive failure, the system will automatic and transparent rebuilds using hot spare drives. The raid set will be reconfigured and rebuilt in the background, while the SATA RAID controller continues to handle system request. During the automatic rebuild process, system activity will continue as normal, however, the system performance and fault tolerance will be affected.

**Important:**

The hot spare must have at least the same capacity as the drive it replaces.

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## **1.4.2 Hot-Swap Disk Drive Support**

The SATA RAID controller has built the protection circuit to support the replacement of SATA hard disk drives without having to shut down or reboot the system. The removable hard drive tray can deliver "hot swappable," fault-tolerant RAID solutions at prices much less than the cost of conventional SCSI hard disk SATA RAID controllers. We provide this feature for controllers to provide the advanced fault tolerant RAID protection and "online" drive replacement.

## **1.4.3 Hot-Swap Disk Rebuild**

A Hot-Swap function can be used to rebuild disk drives in arrays with data redundancy such as RAID level 1, (10), 3, and 5. If a hot spare is not available, the failed disk drive must be replaced with a new disk drive so that the data on the failed drive can be rebuilt. If a hot spare is available, the rebuild starts automatically when a drive fails. The SATA RAID controller automatically and transparently rebuilds failed drives in the background with user-definable rebuild rates. The SATA RAID controller will automatically restart the system and the rebuild if the system is shut down or powered off abnormally during a reconstruction procedure condition. When a disk is Hot Swap, although the system is functionally operational, the system may no longer be fault tolerant. Fault tolerance will be lost until the removed drive is replaced and the rebuild operation is completed.

## **1.5 Understanding RAID**

RAID is an acronym for Redundant Array of Independent Disks. It is an array of multiple independent hard disk drives that provide high performance and fault tolerance. The SATA RAID controller implements several levels of the Berkeley RAID technology. An appropriate RAID level is selected when the volume sets are defined or created. This decision is based on disk capacity, data availability (fault tolerance or redundancy), and disk performance. The following is the RAID level, which support in the SATA RAID controller.

The SATA RAID controller makes the RAID implementation and the disks' physical configuration transparent to the host operating system. This means that the host operating system drivers and software

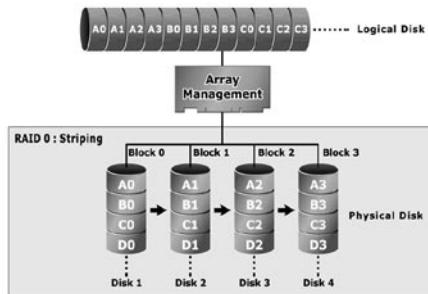
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utilities are not affected, regardless of the RAID level selected. Correct installation of the disk array and the controller requires a proper understanding of RAID technology and the concepts.

## 1.5.1 RAID 0

RAID 0, also referred to as striping, writes stripping of data across multiple disk drives instead of just one disk drive. RAID 0 does not provide any data redundancy, but does offer the best high-speed data throughput. RAID 0 breaks up data into smaller blocks and then writes a block to each drive in the array. Disk striping enhances performance because multiple drives are accessed simultaneously; but the reliability of RAID Level 0 is less than any of its member disk drives due to its lack of redundancy.

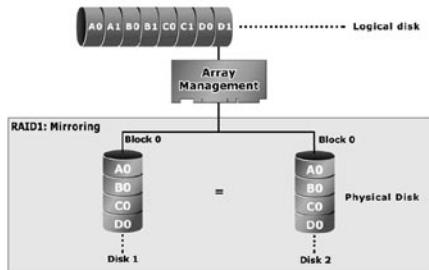


## 1.5.2 RAID 1

RAID 1 also known as “disk mirroring”, data written to one disk drive is simultaneously written to another disk drive. Read performance may be enhanced if the array controller can parallel accesses both members of a mirrored pair. During writes, there will be a minor performance penalty when compared to writing to a single disk. If one drive fails, all data (and software applications) are preserved on the other drive. RAID 1 offers extremely high data reliability, but at the cost of doubling the required data storage capacity.

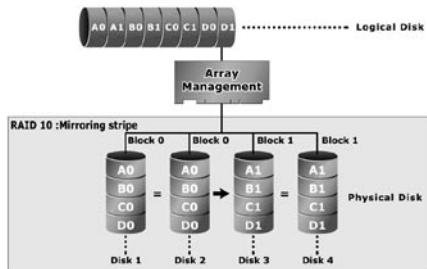
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## 1.5.3 RAID 10

RAID 10 is a combination of RAID 0 and RAID 1, combining striping with disk mirroring. RAID Level 10 combines the fast performance of Level 0 with the data redundancy of Level 1. In this configuration, data is distributed across several disk drives, similar to Level 0, which are a stripe across a number of mirrored sets for data protection. RAID 10 provides the highest read/write performance of any of the Hybrid RAID levels, but at the cost of doubling the required data storage capacity.

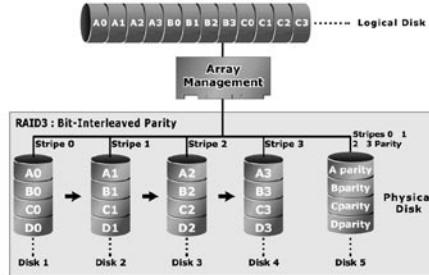


## 1.5.4 RAID 3

RAID 3 provides disk striping and complete data redundancy through a dedicated parity drive. RAID 3 breaks up data into smaller blocks, calculates parity by performing an exclusive-or on the blocks, and then writes the blocks to all but one drive in the array. The parity data created during the exclusive-or is then written to the last drive in the array. If a single drive fails, data is still available by com-

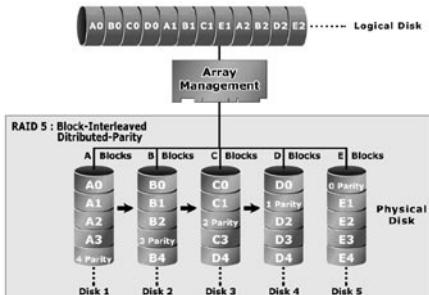
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puting the exclusive-or of the contents corresponding strips of the surviving member disk. RAID-3 is best for applications that require very fast data- transfer rates or long data blocks.



## 1.5.5 RAID 5

RAID 5 is sometimes called striping with parity at byte level. In RAID 5, the parity information is written to all of the drives in the controllers rather than concentrated on a dedicated parity disk. If one drive in the system fails, the parity information can be used to reconstruct the data from that drive. All drives in the array system can be used to seek operation at the same time, greatly increasing the performance of the RAID system. This relieves the write bottleneck that characterizes RAID 4, and is the primary reason that RAID 5 is more often implemented in RAID arrays.



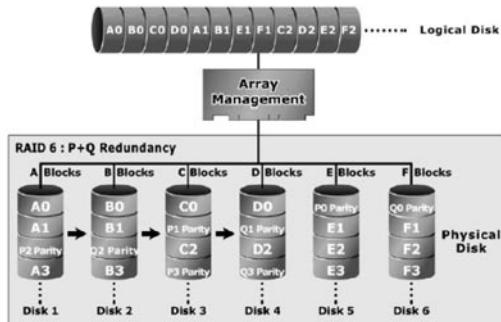
## 1.5.6 RAID 6

RAID 6 provides highest reliability, but not widely used. Similar to RAID 5, but does two different parity computations or the same

# INTRODUCTION

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computation on overlapping subsets of the data. The RAID 6 can offer fault tolerance greater than RAID 1 or RAID 5 but only consumes the capacity of 2 disk drives for distributed parity data. RAID 6 is an extension of RAID 5 that uses a second independent distributed parity scheme. Data is striped on a block level across a set of drives, and then a second set of parity is calculated and written across all of the drives.



# INTRODUCTION

## Summary of RAID Levels

SATA RAID controller supports RAID Levels 0, 1, (10), 3, 5 and 6. Table below provides a summary of RAID levels.

Features and Performance					
RAID Level	Description	Min. Drives	Data Reliability	Data Transfer Rate	I/O Request Rates
0	Also known as stripping Data distributed across multiple drives in the array. There is no data protection	1	No data Protection	Very High	Very High for Both Reads and Writes
1	Also known as mirroring All data replicated on N Separated disks. N is almost always 2. This is a high availability Solution, but due to the 100% duplication, it is also a costly solution.	2	Lower than RAID 6; Higher than RAID 3,5	Reads are higher Than a single disk; Writes similar to a single disk	Reads are twice faster than a single disk; Writes are similar to a single disk.
10	Also known Block-Interleaved Parity. Data and parity information is subdivided and distributed across all disk. Parity must be the equal to the smallest disk capacity in the array. Parity information normally stored on a dedicated parity disk.	3	Lower than RAID 6; Higher than RAID 3,5	Transfer rates more similar to RAID 1 than RAID 0	Reads are twice faster than a single disk; Writes are similar to a single disk.
3	Also known Bit-Interleaved Parity. Data and parity information is subdivided and distributed across all disk. Parity must be the equal to the smallest disk capacity in the array. Parity information normally stored on a dedicated parity disk.	3	Lower than RAID 1, (10), 6; Higher than a single drive	Reads are similar to RAID 0; Writes are slower than a single disk	Reads are similar twice faster than a single disk; Writes are similar to a single disk.
5	Also known Block-Interleaved Distributed Parity. Data and parity information is subdivided and distributed across all disk. Parity must be the equal to the smallest disk capacity in the array. Parity information normally stored on a dedicated parity disk.	3	Lower than RAID 1, (10), 6; Higher than a single drive	Reads are similar to RAID 0; Writes are slower than a single disk	Reads are similar to RAID 0; Writes are slower than a single disk.
6	RAID 6 provides highest reliability, but not widely used. Similar to RAID 5, but does two different parity computations or the same computation on overlapping subsets of the data. The RAID 6 can offer fault tolerance greater than RAID 1 or RAID 5 but only consumes the capacity of 2 disk drives for distributed parity data.	4	highest reliability		

# **HARDWARE INSTALLATION**

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## **2. Hardware Installation**

This section describes the procedures for installing ARC-11xx/12xx series.

### **2.1 Before You begin Installation**

Thanks for purchase SATA RAID Controller as your RAID data storage and management system. This user guide gives simple and step-by-step instructions for installing and configuring your SATA RAID Controller. To ensure your personal safety and protect your equipment and data, carefully read the information that follows the package content list before you begin installing.

#### **Package Contents**

If your package is missing any of the items listed below, contact your local dealer before proceeding with installation (**disk drives and disk mounting brackets are not included**):

ARC-11xx Series SATA RAID Controller

- 1 x PCI-X SATA RAID Controller in an ESD-protective bag
- 4/8/12/16/24 x SATA interface cables (one per port)
- 1 x CD
- 1 x User Manual

ARC-11xxML Series SATA RAID Controller

- 1 x PCI-X SATA RAID Controller in an ESD-protective bag
- 1 x CD
- 1 x User Manual

ARC-12xx Series SATA RAID Controller

- 1 x PCI-Express SATA RAID Controller in an ESD-protective bag
- 4/8/12/16/24 x SATA interface cables (one per port)
- 1 x Installation CD
- 1 x User Manual

# HARDWARE INSTALLATION

## 2.2 Board Layout

Follow the instruction below to install a PCI RAID Card into your PC/ Server.

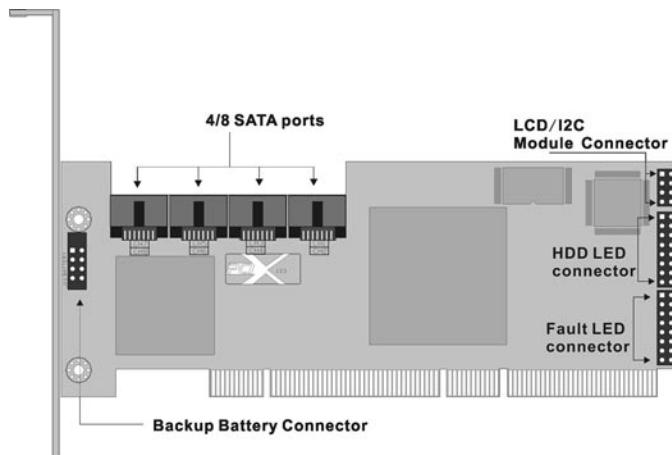


Figure 2-1 ARC-1110/1120 (4/8-port PCI-X SATA RAID Controller)

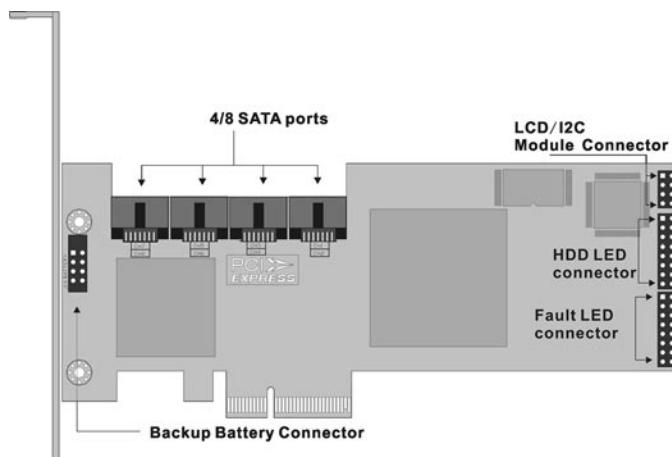


Figure 2-2 ARC-1210/1220 (4/8-port PCI-Express SATA RAID Controller)

# HARDWARE INSTALLATION

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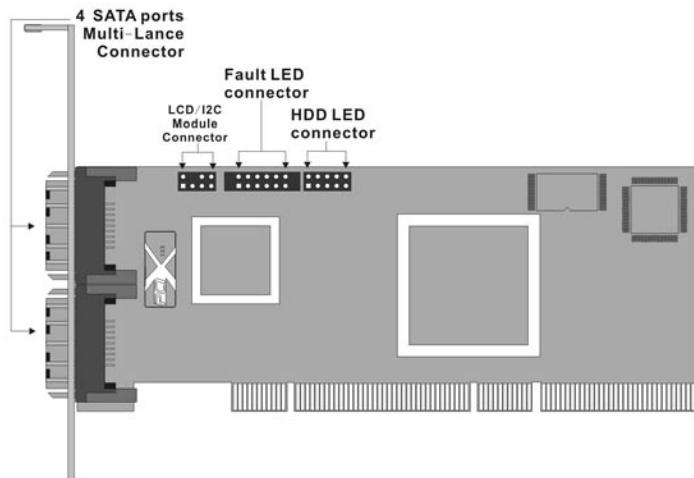


Figure 2-3 ARC-1100ML/1120ML (4/8-port PCI-X SATA RAID Controller)

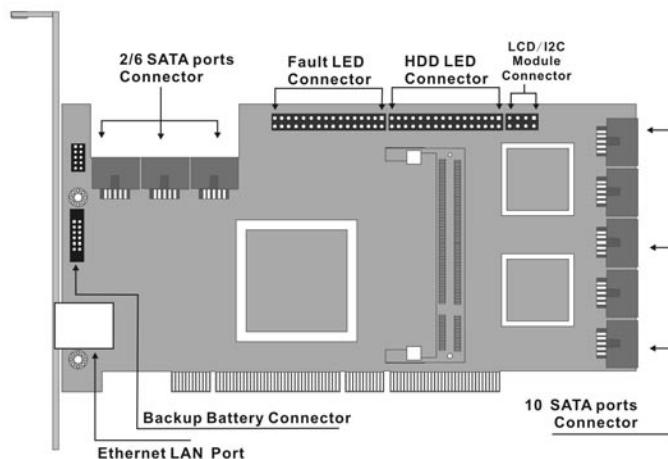


Figure 2-4 ARC-1130/1160 (12/16-port PCI-X SATA RAID Controller)

# HARDWARE INSTALLATION

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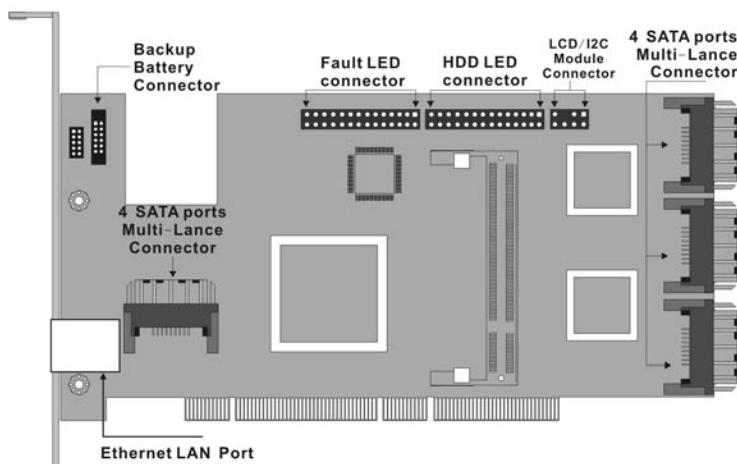


Figure 2-5 ARC-1130ML/1160ML (12/16-port PCI-X SATA RAID Controller)

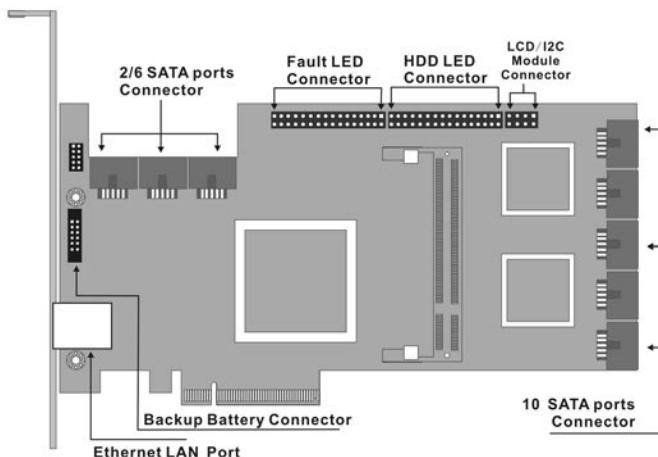


Figure 2-6 ARC-1230/1260 (12/16-port PCI-Express SATA RAID Controller)

# HARDWARE INSTALLATION

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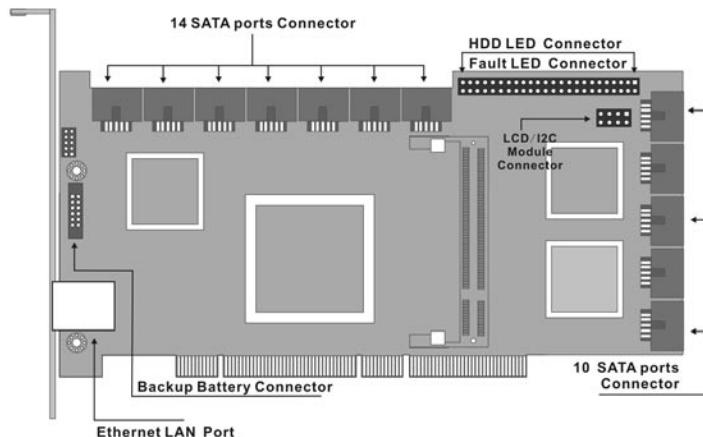


Figure 2-5 ARC-1170 (24-port PCI-X SATA RAID Controller)

## Tools Required

An ESD grounding strap or mat Standard hand tools to open your system's case and install the SATA RAID Controller into an available PCI expansion slot.

## System Requirement

The controller can be installed in a universal PCI slot and requires a motherboard that:

ARC-11xx series

- Complies with the PCI Revision 2.3 32/64-bit 33/66MHz, 3.3V.
- Complies with the PCI-X 32/64-bit 66/100/133 MHz, 3.3V.

ARC-12xx series

- Complies with the PCI-Express X8
- The SATA RAID controller may be connected to up to 4, 8, 12, 16, and 24 SATA II hard drives by the supplied cables.
- An optional cables to connect the drive activity LED and fault LED on the enclosure to the PCI SATA RAID controller.

## Installation Tools

The following items may be needed to assist with installing the

# HARDWARE INSTALLATION

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SATA RAID adapter into an available PCI expansion slot.

- Small screwdriver
- Host system hardware manuals and manuals for disk or enclosure being installed.

## Personal Safety Information

To ensure you personal safety, as well as the safety of your equipment:

- Always wear a grounded strap or work on an ESD-protective mat.
- Before opening the system cabinet, turn off power switches and unplug the power cords. Do not reconnect the power cords until you have replaced the covers.

### **Warning:**

High voltages may be found inside computer equipment. Before installing any of the hardware in this package or removing the protective covers of any computer equipment, turn off power switches and disconnect power cords. Do not reconnect the power cords until you have replaced the covers.

## Electrostatic Discharge

Static electricity can be a serious danger to the electronic components on this SATA RAID adapter. To avoid damage caused by electrostatic discharge, observe the following precautions:

- Don't remove the SATA RAID controller from its anti-static packaging until you are ready to install it into a computer case.
- Handle the SATA RAID Controller by its edges or by the mounting metal bracket at its two ends.
- Before you handle the SATA RAID controller in any way, touch a grounded, anti-static surface, such as an unpainted portion of the system chassis, for a few seconds to discharge any built-up static electricity.

## 2.3 Installation

Follow the instruction below to install a PCI RAID Card into your PC/ Server.

# HARDWARE INSTALLATION

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## Step 1. Unpack

Unpack and remove the PCI RAID card from the package. Inspect it carefully, if anything is missing or damaged, contact your local dealer.

## Step 2. Power PC/Server Off

Turn off computer and remove the AC power cord. Remove the system's cover. See the computer system documentation for instruction.

## Step 3. Install the PCI RAID Cards

To install the SATA RAID adapter, remove the mounting screw and existing bracket from the rear panel behind the selected PCI slot. Align the gold-fingered edge on the card with the selected PCI expansion slot . Press down gently but firmly to ensure that the card is properly seated in the slot, as shown in Figure 2-4. Then screw the bracket into the computer chassis. The card can fit in both PCI and PCI-X slots. It can get the best performance while the SATA RAID controller runs in the 64-bit/133MHz PCI-X slot.

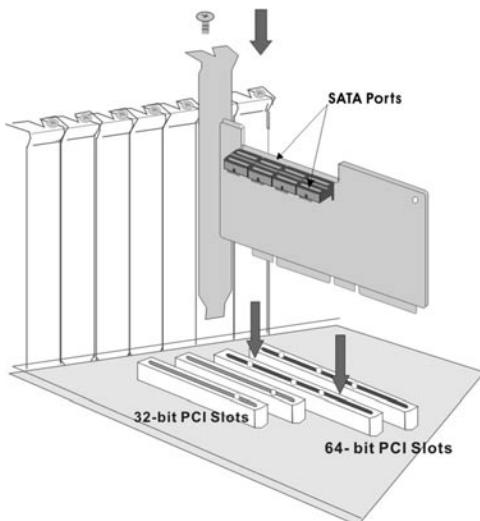


Figure 2-7 Insert PCI RAID Card into a PCI slot

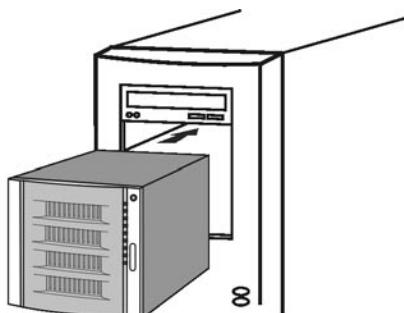
# HARDWARE INSTALLATION

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## Step 5. Mount the Cages or Drives

Remove the front bezel from the computer chassis and install the Cages or SATA Drives in the computer chassis. Loading drives to the drive tray if cages are installed. Be sure that the power is connected to either the Cage backplane or the individual drives.

Figure 2-8 Mount Cages & Drives



## Step 6 Connect the SATA cable

Model ARC-11XX and ARC-12XX have dual-layer SATA internal connector. If you have not already connected your SATA cables, use the cables included with your kit to connect your controller to the SATA hard drives.

The cable connectors are all identical, so it does not matter which end you connect to your controller or SATA hard drive or cage backplane SATA connector.

Figure 2-9 SATA Cable



# HARDWARE INSTALLATION

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## Step 6-2. Connect the Multi-lance cable

Model ARC-11XX-ML have multi-lance internal connector, each of which can support up to four SATA drives. These adapters can be installed in a server RAID enclosure with InfiniBand 4X connectors (SFF-8470) backplane.

If you have not already connected your Multi-lance cables, use the cables included with your kit to connect your controller to the Multi-lance connector backplane. The cable connectors are all identical, so it does not matter which end you connect to your controller or Multi-lance backplane connector. The following diagram shows the picture of Multi-lane cable.

Unpack and remove the PCI RAID cards. Inspect it carefully. If anything is missing or damaged, contact your local dealer.

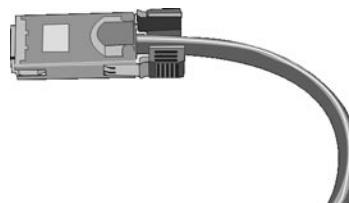
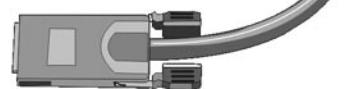


Figure 2-10 Multi-Lance Cable



## Step 7 Install the LED cable (optional)

SATA RAID controller provides three kinds of LED status connector.

A: Global indicator connector, which lights when any drive is active.

B: Individual LED indicators connector, for each channel drive.

C: I2C connector, for SATA proprietary backplane enclosure.

The following diagram and description will show each type of connector.

### **Note:**

A cable for the global indicator comes with your computer system. Cables for the individual drive LEDs may come with a drive cage, or you may need to purchase them.

# HARDWARE INSTALLATION

## A: Global Indicator Connector

If your system wants to show the global LED in a two-pin LED drive activity connector, use the first two pin of the activity LED connector. The following diagram shows the connector and setting.

Figure 2-11, ARC-1110/1120/1210/1220 global LED connection for Computer Case.

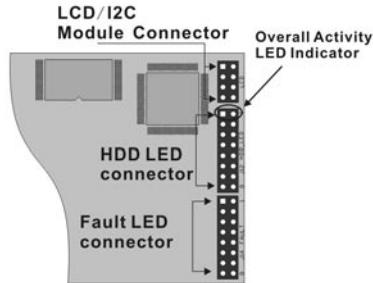


Figure 2-12, ARC-1130/1160/1230/1260 global LED connection for Computer Case.

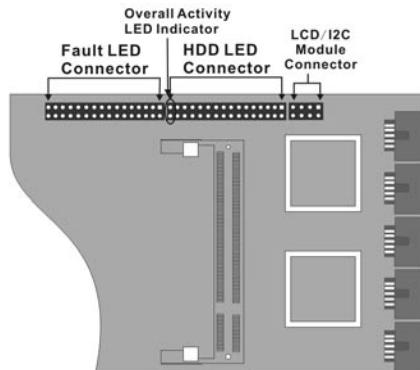
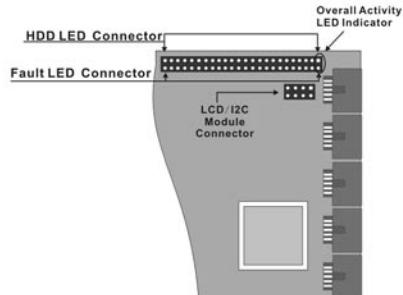


Figure 2-13, ARC-1170/1270 global LED connection for Computer Case.



# HARDWARE INSTALLATION

## B: Individual LED indicators connector

Insert the cable from drive activity LED or fault LED connector on backplane of cage to the respective connector on the SATA RAID controller. The following table illustrate the fault/activity LED.

LED	Normal Status	Problem Indication
Disk Activity	When the activity LED is illuminated, there is I/O activity on that disk drive. When the LED is dark, there is no activity on that disk drive.	N/A
Fault LED	When the fault LED is solid illuminated, there is no disk present.	When the Red LED is slow blinking (2 times/sec), that disk drive has failed and should be hot-swapped immediately. When the Blue LED is illuminated and Red LED is fast blinking (10 times/sec) there is rebuilding activity on that disk drive.

Figure 2-14, ARC-1110/1120/1210/1220 Individual LED indicators connector, for each channel drive.

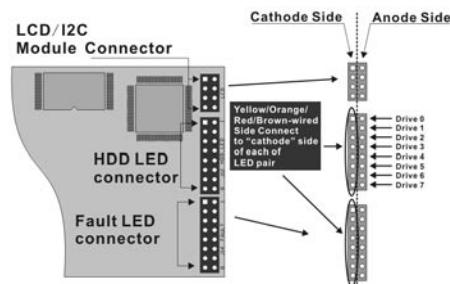
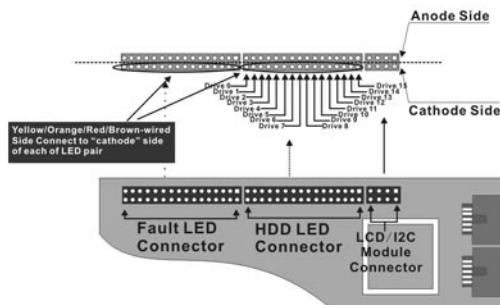


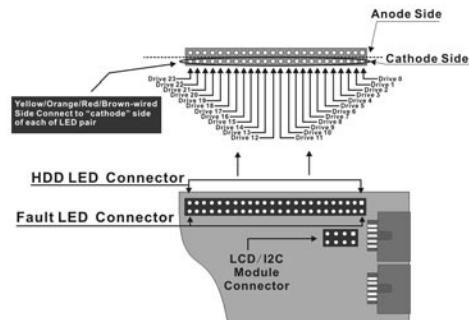
Figure 2-15, ARC-1130/1160/1230/1260 Individual LED indicators connector, for each channel drive.



# HARDWARE INSTALLATION

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Figure 2-16, ARC-1170/1270 Individual LED indicators connector, for each channel drive.



## C: I2C Connector

You can also connect the I2C interface to the SATA proprietary backplane enclosure. This can reduce the number of activity LED or fault LED cable. The I2C interface can also cascade to another SATA backplane enclosure for the additional channel status display.

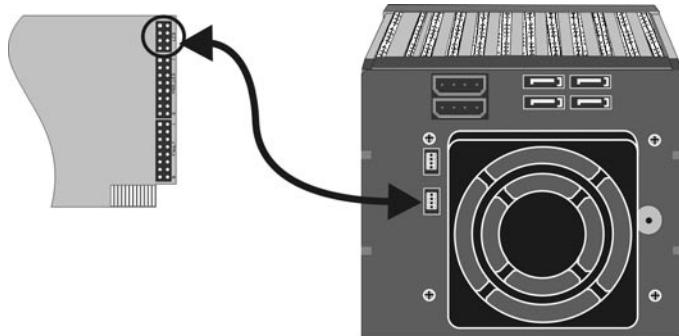
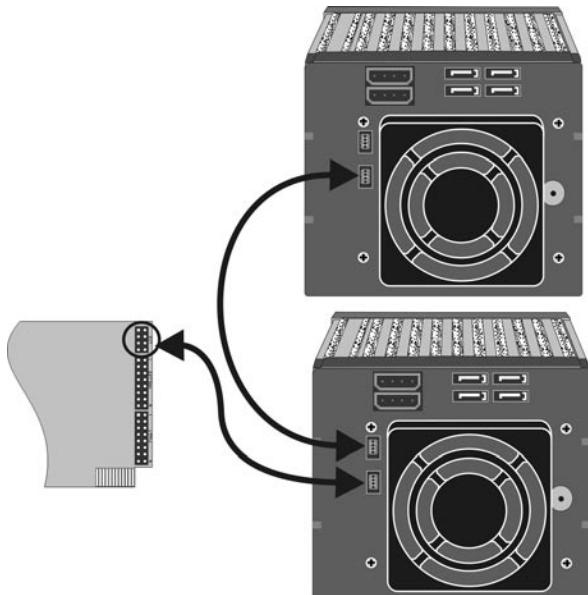


Figure 2-17, Activity LED I2C connector connected between SATA RAID Controller & SATA HDD Cage backplane.

# HARDWARE INSTALLATION

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Figure 2-18,  
Activity LED I2C  
connector con-  
nected between  
SATA RAID Con-  
troller & 2 SATA  
HDD Cages back-  
plane.



## Step 8. Power up the System

Safety checks the installation, reinstall the computer cover and reconnect the power cord cables. Turn on the AC power switch at the rear of the computer then press the power button at the front of the host computer.

## Step 9. Configure volume set

The adapter configures the RAID function through the McBIOS RAID manager. Please reference the Chapter 3 **McBIOS RAID Manager** for the detail configuration. The RAID configuration can also be configured by McRAID storage manager. After ArcHttp proxy server be installed. Please reference the Chapter 6 **Web Browser-Based** Configuration.

## Step 10. Install the controller driver

In a new system:

- Driver installation usually takes place as part of operating system installation. Please reference the Chapter 4 Driver Installation

# HARDWARE INSTALLATION

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for the detail installation procedure.

## In an existing system:

- Install the controller driver to the existing operating system. Please reference the Chapter 4 Driver Installation for the detail installation procedure.

### **Note:**

Look for further release version driver of Linux and FreeBSD:

- See the Driver Library at <http://www.areca.com.tw>

## **Step 11. Install ArcHttp proxy Server**

The SATA RAID controller firmware has embedded the web-browser RAID manager and SNMP agent function. ArcHttp Proxy driver will enable it. The Browser-based RAID manager provides all of the creation, management, and monitor SATA RAID controller status. Please reference the Chapter 5 for the detail ArcHttp proxy server installation. The SNMP agent function please reference appendix C.

## **Step 12. Determining the Boot sequences**

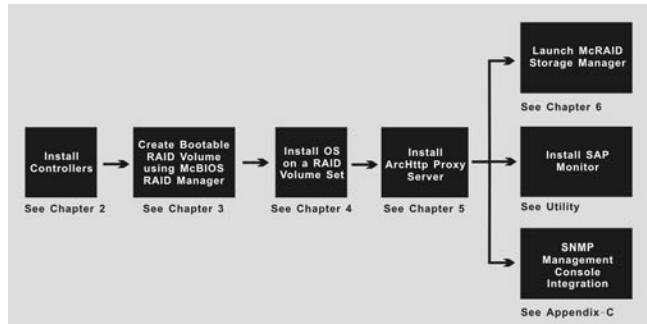
SATA RAID is a bootable controller. If your system already contains a bootable device with an installed operating system, you can set up your system to boot a second operating system from the new controller. To add a second bootable controller, you may need to enter Setup and change the device boot sequence so that the SATA RAID controller heads the list. If system BIOS Setup does not allow this change, your system may not be configurable to allow the SATA RAID controller to act as a second boot device.

## **Summary Of the installation**

The flow chart below describes the installation procedures for SATA RAID controller. These procedures included hardware installation, the creation and configuration of a RAID volume through the McBios, OS installation and installation of SATA RAID controller software.

# HARDWARE INSTALLATION

Configuration Utility	Operating System supported
McBIOS RAID Manager	OS-Independent
McRAID Storage Manager (Via Archtp proxy server)	Windows 2000/XP/2003, Linux and FreeBSD
SAP Monitor (Single Admin portal to scan for multiple RAID units in the network, Via ArcHttp Proxy Server)	Windows 2000/XP/2003 Java based for Windows. Linux and FreeBSD (available in Q2, 2005)
SNMP Manager Console Integration (Via Archtp Proxy Server)	Windows 2000/XP/2003, Linux. FreeBSD (available in Q2, 2005)



The software components configure and monitor the SATA RAID controller via ArcHttp Proxy Server.

## **McRAID Storage Manager**

Launching the Firmware-embedded web browser McRAID Storage manager, you need first to install the ArcHttp Proxy Server in your server system. If you need additional information about installation and start-up the function, see the McRAID Storage Manager section in the chapter 6.

## **SNMP Manager Console Integration**

Launching the Firmware-embedded SNMP agent, you need first to install the ArcHttp Proxy Server in your server system. If you need additional information about installation and start-up the function, see the SNMP operation & Installation section in the Appendix-C.

# **HARDWARE INSTALLATION**

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## **Single Admin Portal (SAP) Monitor**

Scan for multiple RAID units in the network and monitor the controller set status. It also includes disks stress test utility to kick out disks meeting marginal spec before the RAID unit is actually put on-line for real business.

For additional information, see the Utility manual in the package CD-ROM or download from the web site <http://www.areca.com.tw>.

# BIOS CONFIGURATION

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## 3. McBIOS RAID Manager

The mainboard BIOS automatically configures the SATA RAID controller parameter at power-up;

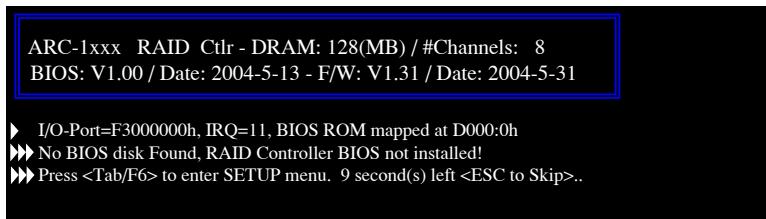
- I/O Port Address
- Interrupt channel(IRQ)
- Adapter ROM Base Address

Use McBIOS to further configure the SATA RAID adapter to suit your operating system.

### 3.1 Starting the McBIOS RAID Manager

This section explains how to use the McBIOS Setup Utility to configure your RAID system. The BIOS Setup Utility is designed to be user-friendly. It is a menu-driven program, residing in the firmware, which allows you to scroll through its various sub-menus and select among the predetermined choices.

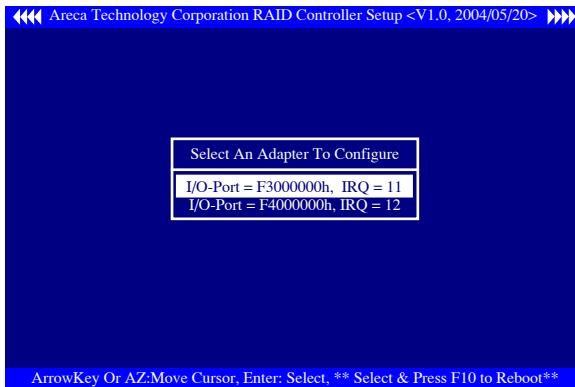
When starting the system with an SATA RAID controller installed, the start-up sequence displays the following message appears on your monitor:



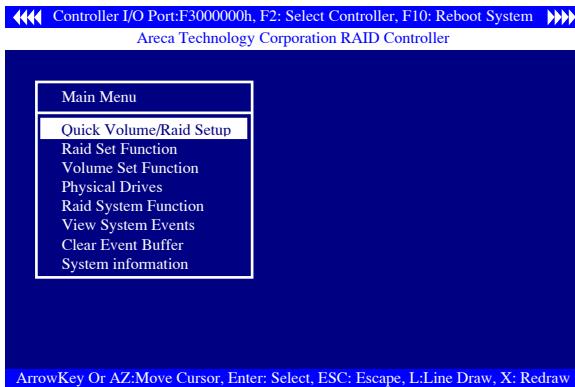
The McBIOS configuration manager message remains on your screen for about nine seconds, giving you time to start the configuration menu by pressing **Tab** or **F6**. If you do not wish to enter configuration menu, press **<ESC>** to skip configuration. When activated, the McBIOS window appears showing a selection dialog box listing the SATA RAID controller that are installed in the system. The legend at the bottom of the screen shows you what keys are enabled for the windows.

# BIOS CONFIGURATION

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Use Up and Down arrow keys to select the adapter you want to configure. While a desired adapter is highlighted, press the <Enter> key to enter the Main Menu of the McBIOS Configuration Utility.



## 3.2 McBIOS Configuration manager

The McBIOS configuration utility is firmware-based and uses to configure raid sets and volume sets. Because the utility resides in the SATA RAID controller firmware, its operation is independent of the operating systems on your computer. Use this utility to:

- Create raid set,
- Expand raid set,

# BIOS CONFIGURATION

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- Define volume set,
- Add physical drive,
- Modify volume set,
- Modify RAID level/stripe size,
- Define pass-through disk drives,
- Modify system function, and
- Designate drives as hot spares.

## 3.3 Configuring Raid Sets and Volume Sets

You can configure raid sets and volume sets with McBIOS RAID manager using Quick Volume/Raid Setup automatically, or Raid Set/Volume Set Function manually configuration method. Each configuration method requires a different level of user input. The general flow of operations for raid set and volume set configuration is:

Step	Action
1	Designate hot spares/pass-through (optional).
2	Choose a configuration method.
3	Create raid sets using the available physical drives.
4	Define volume sets using the space in the raid set.
5	Initialize the volume sets (logical drives) and use volume sets in the host OS.

## 3.4 Designating Drives as Hot Spares

All unused disk drive that is not part of a raid set can be created as a Hot Spare. The Quick Volume/Raid Setup configuration will automatically add the spare disk drive with the raid level for user to select. For the Raid Set Function configuration, user can use the Create Hot Spare option to define the hot spare disk drive.

A Hot Spare disk drive can be created when you choose the Create Hot Spare option in the Raid Set Function, all unused physical devices connected to the current controller appear:

Select the target disk by clicking on the appropriate check box.

Press the **Enter** key to select a disk drive, and press **Yes** in the Create Hot Spare to designate it as a hot spare.

# BIOS CONFIGURATION

## 3.5 Using Quick Volume /Raid Setup Configuration

In Quick Volume /Raid Setup Configuration, it collects all drives in the tray and include them in a raid set. The raid set you create is associated with exactly one volume set, and you can modify the default RAID level, stripe size, and capacity of the volume set. Designating Drives as Hot Spares will also show in the raid level selection option. The volume set default settings will be:

Parameter	Setting
Volume Name	Volume Set # 00
SCSI Channel/SCSI ID/SCSI LUN	0/0/0
Cache Mode	Write Back
Tag Queuing	Yes

The default setting values can be changed after configuration is complete. Follow the steps below to create arrays using Quick Volume /Raid Setup Configuration:

Step	Action
1	Choose <b>Quick Volume /Raid Setup</b> from the main menu. The available RAID levels with hot spare for the current volume set drive are displayed.
2	Recommend use drives have same capacity in a specific array. If you use drives with different capacities in an array, all drives in the raid set will select the lowest capacity of the drive in the raid set. The numbers of physical drives in a specific array determine the RAID levels that can be implemented with the array. RAID 0 requires 1 or more physical drives RAID 1 requires at least 2 physical drives RAID 1+Spare requires at least 3 physical drives RAID 3 requires at least 3 physical drives RAID 5 requires at least 3 physical drives RAID 3 +Spare requires at least 4 physical drives RAID 5 + Spare requires at least 4 physical drives RAID 6 requires at least 4 physical drives RAID 6 + Spare requires at least 5 physical drives Highlight <b>RAID level</b> for the volume set and press <b>Enter</b> key to confirm.
3	Set the capacity size for the current volume set. After Highlight RAID level and press <b>Enter</b> key. The selected capacity for the current volume set is displayed. Using the <b>UP</b> and <b>DOWN</b> arrow key to create the current volume set capacity size and press <b>Enter</b> key to confirm. The available stripe sizes for the current volume set are displayed.

# BIOS CONFIGURATION

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4	Using <b>UP</b> and <b>DOWN</b> arrow key to select the current volume set stripe size and press <b>Enter</b> key to confirm it. This parameter specifies the size of the stripes written to each disk in a RAID 0, 1, 5 or 6 Volume Set. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. A larger stripe size provides better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random read requests more often, choose a small stripe size.
5	When you are finished defining the volume set, press <b>Enter</b> key to confirm the Quick Volume And Raid Set Setup function.
6	Foreground (Fast Completion) Press <b>Enter</b> key to define fast initialization or Selected the Background (Instant Available). In the background Initialization, the initialization proceeds as a background task, the volume set is fully accessible for system reads and writes. The operating system can instantly access to the newly created arrays without requiring a reboot and waiting the initialization complete. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.
7	Initialize the volume set you have just configured
8	If you need to add additional volume set, using main menu Create Volume Set function

## 3.6 Using Raid Set/Volume Set Function Method

In Raid Set Function, you can use the Create Raid Set function to generate the new raid set. In Volume Set Function, you can use the Create Volume Set function to generate its associated volume set and parameters.

If the current controller has unused physical devices connected, you can choose the Create Hot Spare option in the Raid Set Function to define a global hot spare. Select this method to configure new raid sets and volume sets. The Raid Set/Volume Set Function configuration option allows you to associate volume set with partial and full raid set.

# BIOS CONFIGURATION

Step	Action
1	To setup the Hot Spare (option), choose <b>Raid Set Function</b> from the main menu. Select the <b>Create Hot Spare</b> and press <b>Enter</b> key to set the Hot Spare.
2	Choose Raid Set Function from the main menu. Select the Create Raid Set and press Enter key.
3	Select a Drive For Raid Set window is displayed showing the IDE drive connected to the current controller.
4	Press <b>UP</b> and <b>DOWN</b> arrow keys to select specific physical drives. Press the <b>Enter</b> key to associate the selected physical drive with the current raid set. Recommend use drives has same capacity in a specific raid set. If you use drives with different capacities in an array, all drives in the raid set will select the lowest capacity of the drive in the raid set. The numbers of physical drives in a specific raid set determine the RAID levels that can be implemented with the raid set. RAID 0 requires 1 or more physical drives per raid set. RAID 1 requires at least 2 physical drives per raid set. RAID 3 requires at least 3 physical drives per raid set. RAID 5 requires at least 3 physical drives per raid set. RAID 6 requires at least 4 physical drives per raid set.
5	After adding physical drives to the current raid set as desired, press Yes to confirm the Create Raid Set function.
6	An Edit The Raid Set Name dialog box appears. Enter 1 to 15 alphanumeric characters to define a unique identifier for a raid set. The default raid set name will always appear as Raid Set. #. Press Enter to finish the name editing.
7	Press <b>Enter</b> key when you are finished creating the current raid set. To continue defining another raid set, repeat step 3. To begin volume set configuration, go to step 8.
8	Choose <b>Volume Set Function</b> from the Main menu. Select the <b>Create Volume Set</b> and press <b>Enter</b> key.
9	Choose one raid set from the Create Volume From Raid Set window. Press Enter key to confirm it.
10	Foreground (Fast Completion) Press <b>Enter</b> key to define fast initialization or Selected the Background (Instant Available). In the background Initialization, the initialization proceeds as a background task, the volume set is fully accessible for system reads and writes. The operating system can instantly access to the newly created arrays without requiring a reboot and waiting the initialization complete. In Fast Initialization, the initialization proceeds must be completed before the volume set ready for system accesses.
11	If space remains in the raid set, the next volume set can be configured. Repeat steps 8 to 10 to configure another volume set.

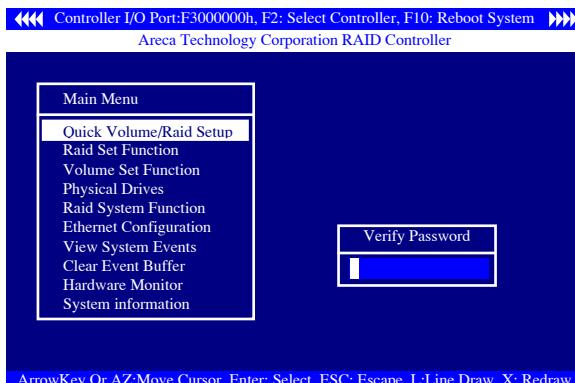
# BIOS CONFIGURATION

## **Note:**

User can use this method to examine the existing configuration. Modify volume set configuration method provides the same functions as create volume set configuration method. In volume set function, you can use the modify volume set function to modify the volume set parameters except the capacity size:

## 3.7 Main Menu

The main menu shows all function that enables the customer to execute actions by clicking on the appropriate link.



## **Note:**

The manufacturer default password is set at **0000**, this password can be modified by selecting the **Change Password** in the section of **Raid System Function**.

Option	Description
Quick Volume/Raid Setup	Create a default configuration which based on numbers of physical disk installed
Raid Set Function	Create a customized raid set
Volume Set Function	Create a customized volume set
Physical Drives	View individual disk information
Raid System Function	Setting the raid system configuration
Ethernet Configuration	Ethernet LAN setting (ARC-1x30/1x60/1x70 only)
View System Events	Record all system events in the buffer
Clear Event Buffer	Clear all event buffer information
Hardware Monitor	Show all system environment status
System Information	View the controller information

# BIOS CONFIGURATION

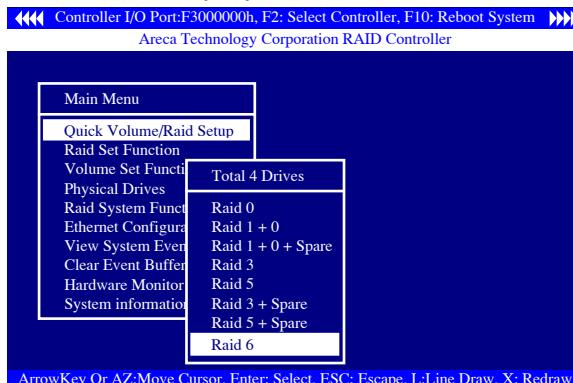
This password option allows user to set or clear the raid controller's password protection feature. Once the password has been set, the user can only monitor and configure the raid controller by providing the correct password. The password is used to protect the internal RAID controller from unauthorized entry. The controller will check the password only when entering the Main menu from the initial screen. The RAID controller will automatically go back to the initial screen when it does not receive any command in twenty seconds.

## 3.7.1 Quick Volume/RAID Setup

Quick Volume/RAID Setup is the fastest way to prepare a raid set and volume set. It only needs a few keystrokes to complete it. Although disk drives of different capacity may be used in the raid set, it will use the smallest capacity of disk drive as the capacity of all disk drives in the raid set. The Quick Volume/RAID Setup option creates a raid set with the following properties:

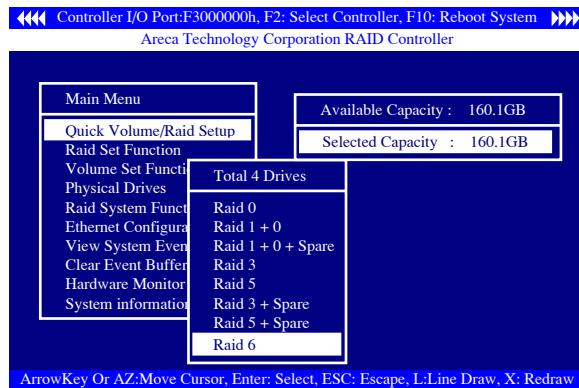
1. All of the physical drives are contained in a raid set.
2. The raid levels associated with hot spare, capacity, and stripe size are selected during the configuration process.
3. A single volume set is created and consumed all or a portion of the disk capacity available in this raid set.
4. If you need to add additional volume set, using main menu Create Volume set function.

The total physical drives in a specific raid set determine the RAID levels that can be implemented with the raid set. Press the **Quick Volume/RAID Setup** from the main menu; all possible RAID levels screen will be displayed.

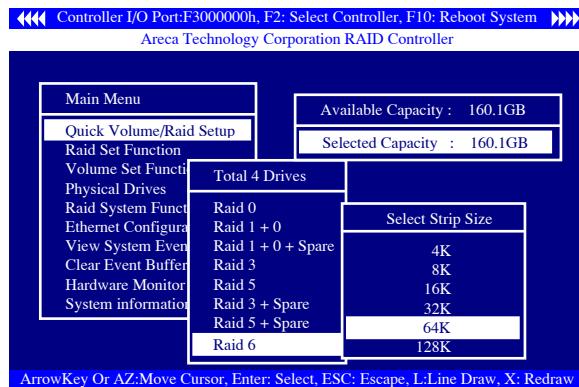


# BIOS CONFIGURATION

A single volume set is created and consumed all or a portion of the disk capacity available in this raid set. Define the capacity of volume set in the Available Capacity popup. The default value for the volume set is displayed in the selected capacity. To enter a value less than the available capacity, type the value and press the **Enter** key to accept this value. If it only use part of the raid set capacity, you can use the **Create Volume Set** option to define another volume sets

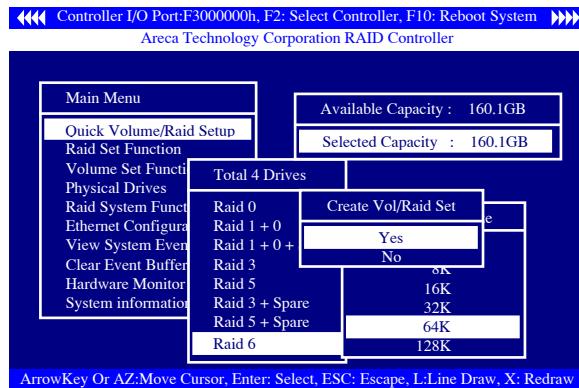


**Stripe size** This parameter sets the size of the stripe written to each disk in a RAID 0, 1, 3, or 5 logical drive. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB. A larger stripe size produces better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random reads more often, select a small stripe size.

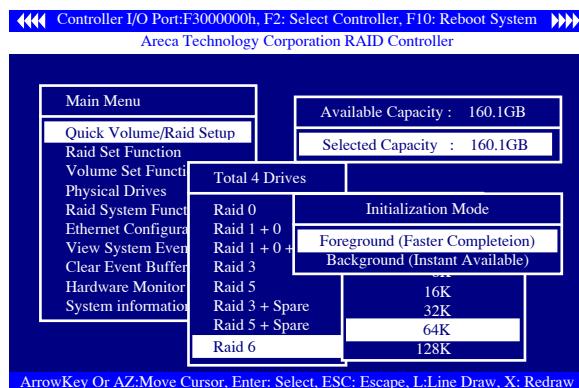


# BIOS CONFIGURATION

Press the **Yes** key in the Create Vol/Raid Set dialog box, the raid set and volume set will start to initialize it.



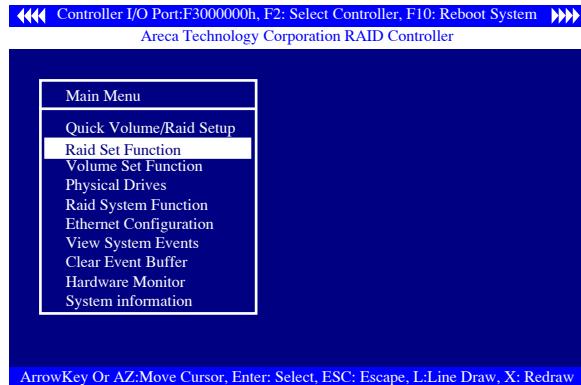
Select Foreground (Faster Completion) or Background (Instant Available) for initialization.



## 3.7.2 Raid Set Function

User manual configuration can complete control of the raid set setting, but it will take longer to complete than the Quick Volume/Raid Setup configuration. Select the Raid Set Function to manually configure the raid set for the first time or deletes existing raid set and reconfigures the raid set.

# BIOS CONFIGURATION

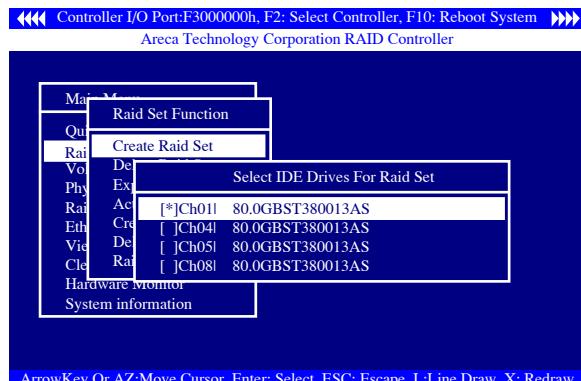


## 3.7.2.1 Create Raid Set

To define raid set, follow the procedure below:

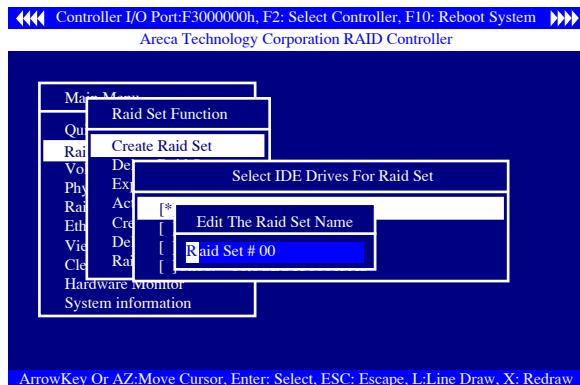
1. Select Raid Set Function from the main menu.
2. Select Create Raid Set option from the Raid Set Function dialog box.
3. A Select IDE Drive For Raid Set window is displayed showing the IDE drive connected to the current controller. Press the **UP** and **DOWN** arrow keys to select specific physical drives. Press the Enter key to associate the selected physical drive with the current raid set. Repeat this step, as many disk drives as user want to add in a single raid set.

To finish selecting IDE drives For Raid Set, press **Esc** key. A Create Raid Set confirmation screen appears, Press **Yes** key to confirm it.



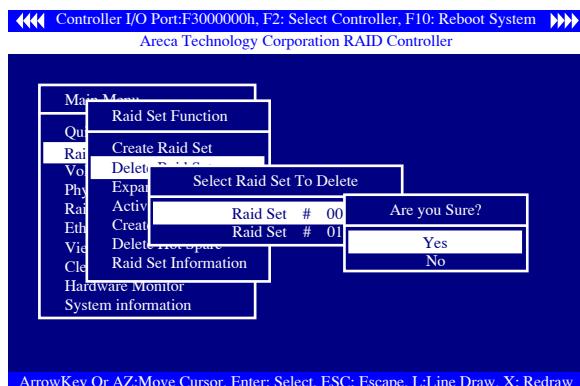
# BIOS CONFIGURATION

4. An Edit The Raid Set Name dialog box appears. Enter 1 to 15 alphanumeric characters to define a unique identifier for a raid set. The default raid set name will always appear as Raid Set. #.



## 3.7.2.2 Delete Raid Set

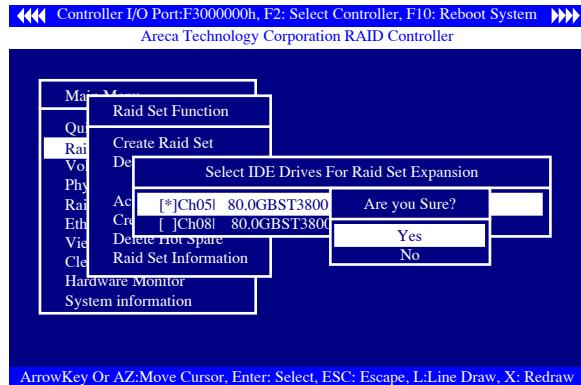
To change a raid set, you should first delete it and re-create the raid set. To delete a raid set, select the raid set number that user want to delete in the Select Raid Set to Delete screen. The Delete Raid Set dialog box appears, then press **Yes** key to delete it.



## 3.7.2.3 Expand Raid Set

Instead of deleting a raid set and recreating it with additional disk drives, the Expand Raid Set function allows the users to add disk drive to the raid set that was created.

# BIOS CONFIGURATION



To expand a raid set:

Click on Expand Raid Set option. If there is an available disk, then the Select IDE Drives For Raid Set Expansion screen appears.

Select the target Raid Set by clicking on the appropriate radial button. Select the target disk by clicking on the appropriate check box.

Presses **Yes** key to start expand the raid set.

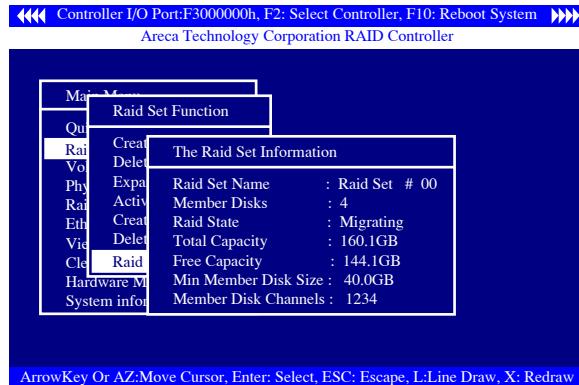
The new add capacity will be define one or more volume sets. Follow the instruction presented in the Volume Set Function to create the volume set's.

## **Note:**

1. Once the Expand Raid Set process has started, user cannot stop it. The process must be completed.
2. If a disk drive fails during raid set expansion and a hot spare is available, an auto rebuild operation will occur after the raid set expansion completes.

## ● **Migrating**

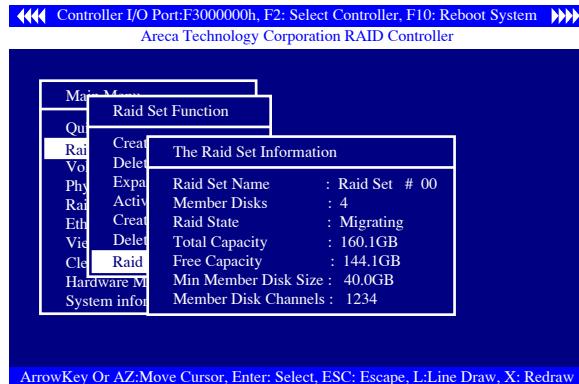
# BIOS CONFIGURATION



Migrating occurs when a disk is added to a Raid Set. Migration status is displayed in the raid status area of the Raid Set information when a disk is added to a raid set. Migrating status is also displayed in the associated volume status area of the Volume Set Information when a disk is added to a raid set.

## 3.7.2.4 Activate Incomplete Raid Set

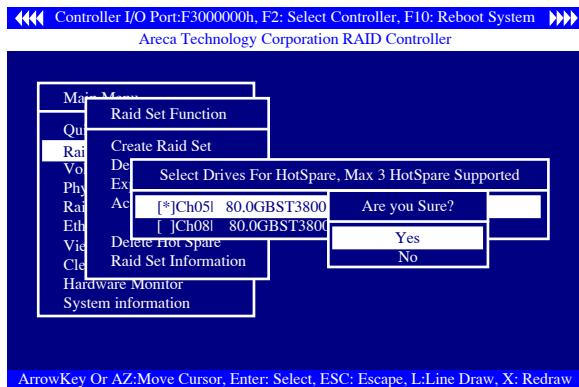
The following screen is the Raid Set Information after one of its disk drive has removed in the power off state.



When one of the disk drive is removed in power off state, the raid set state will change to Incomplete State. If user wants to continue to work, when the SATA RAID controller is power on. User can use the Activate Raid Set option to active the raid set. After user complete the function, the Raid State will change to Degraded Mode.

# BIOS CONFIGURATION

## 3.7.2.5 Create Hot Spare



When you choose the Create Hot Spare option in the Raid Set Function, all unused physical devices connected to the current controller appear:

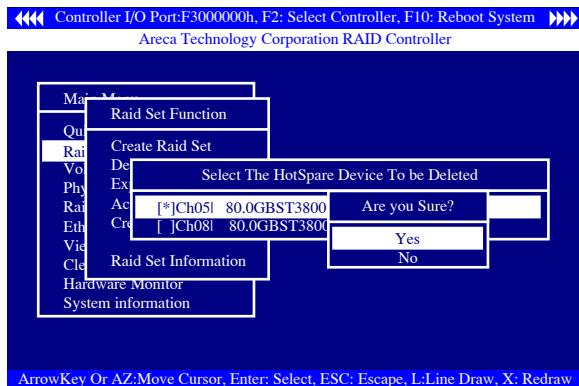
Select the target disk by clicking on the appropriate check box. Press the **Enter** key to select a disk drive and press **Yes** in the Create Hot Spare to designate it as a hot spare.

The create Hot Spare option gives you the ability to define a global hot spare.

## 3.7.2.6 Delete Hot Spare

Select the target Hot Spare disk to delete by clicking on the appropriate check box.

Press the **Enter** keys to select a disk drive, and press **Yes** in the Delete Hot Spare to delete the hot spare.

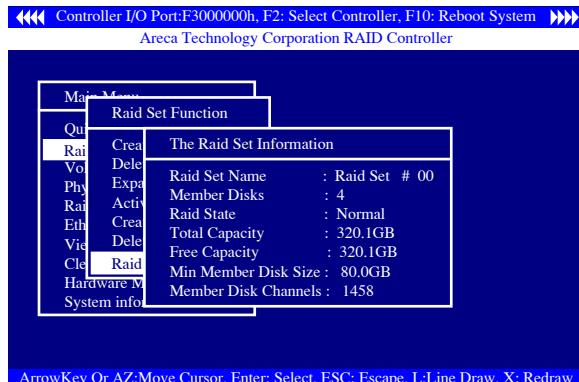


# BIOS CONFIGURATION

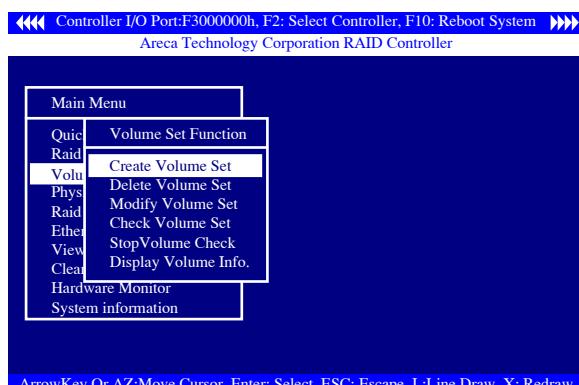
## 3.7.2.7 Raid Set Information

To display Raid Set information, move the cursor bar to the desired Raid Set number, then press **Enter** key. The Raid Set Information will show as above.

You can only view the information of this Raid Set.



## 3.7.3 Volume Set Function



A Volume Set is seen by the host system as a single logical device. It is organized in a RAID level with one or more physical disks. RAID level refers to the level of data performance and protection of a Volume Set. A Volume Set capacity can consume all or a portion of the disk capacity available in a Raid Set. Multiple Volume Sets can exist on a group of disks in a Raid Set. Additional Volume Sets created in a specified Raid Set will reside

# BIOS CONFIGURATION

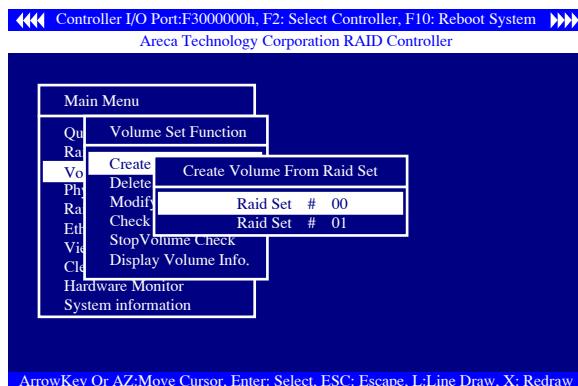
on all the physical disks in the Raid Set. Thus each Volume Set on the Raid Set will have its data spread evenly across all the disks in the Raid Set.

## 3.7.3.1 Create Volume Set

1. Volume sets of different RAID levels may coexist on the same raid set.
2. Up to 16 volume sets in a raid set can be created by the SATA RAID controller.
3. The maximum addressable size of a single volume set is 2 TB(32-bit mode).

To create a volume set, follow the following steps:

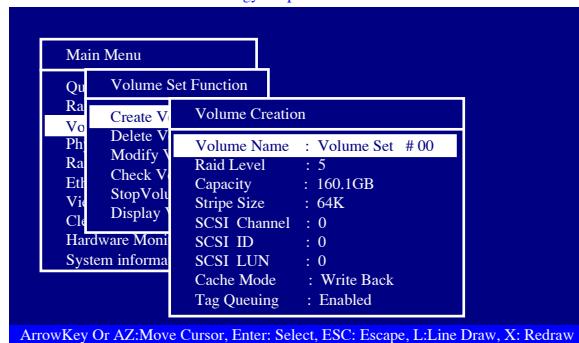
1. Select the Volume Set Function from the Main menu.
2. Choose the Create Volume Set from Volume Set Functions dialog box screen.
3. The Create Volume From Raid Set dialog box appears. This screen displays the existing arranged raid sets. Select the raid set number and press **Enter** key. The Volume Creation is displayed in the screen.



4. A window with a summary of the current volume set's settings. The “**Volume Creation**” option allows user to select the Volume name, capacity, RAID level, strip size, SCSI ID/LUN, Cache mode and tag queuing. User can modify the default values in this screen; the modification procedures are at 3.5.3.3 section.

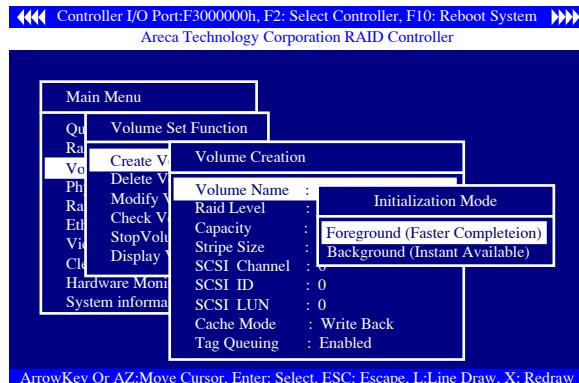
# BIOS CONFIGURATION

Controller I/O Port:F300000h, F2: Select Controller, F10: Reboot System  
Areca Technology Corporation RAID Controller



5. After completing the modification of the volume set, press Esc key to confirm it. A Fast Initialization screen is presented.

- Select Foreground(Fast Completion) for Fast Initialization of the selected volume set.
- Select Background(Instant Available) for Normal Initialization of the selected volume set.

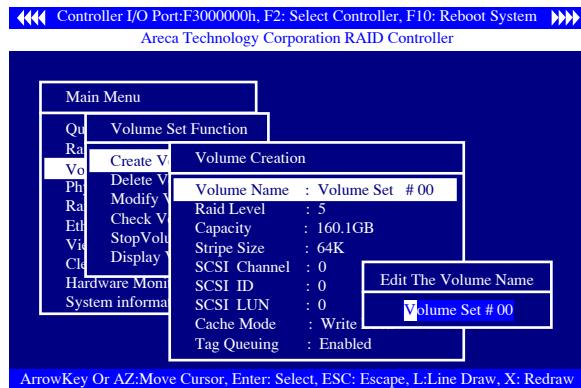


6. Repeat steps 3 to 5 to create additional volume sets.

7. The initialization percentage of volume set will be displayed at the button line.

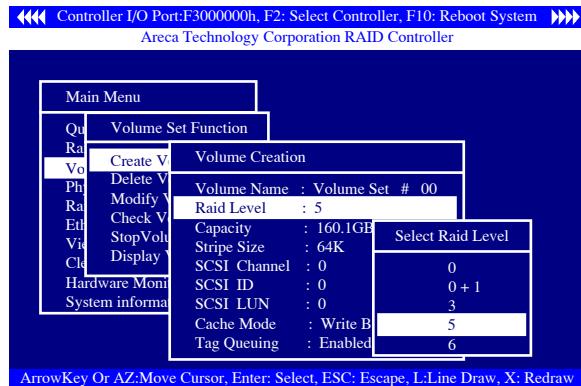
# BIOS CONFIGURATION

## ● Volume Name



The default volume name will always appear as Volume Set. #. You can rename the volume set name providing it does not exceed the 15 characters limit.

## ● Raid Level

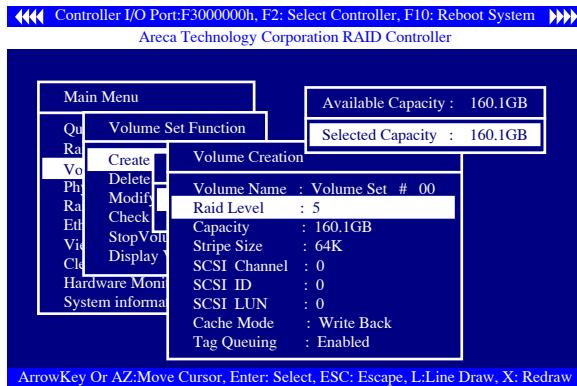


Set the RAID level for the Volume Set. Highlight Raid Level and press <Enter>.

The available RAID levels for the current Volume Set are displayed. Select a RAID level and press **Enter** key to confirm.

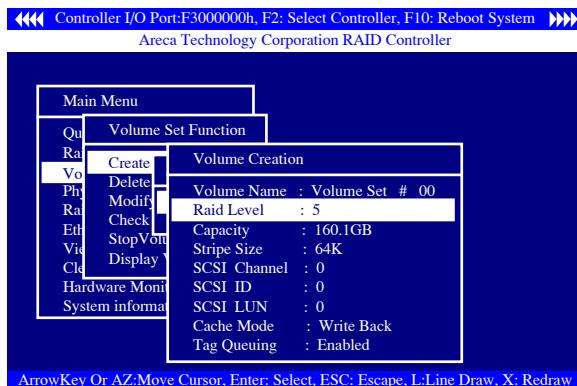
# BIOS CONFIGURATION

## ● Capacity



The maximum volume size is default in the first setting. Enter the appropriate volume size to fit your application. The capacity can also increase or decrease by the **UP** and **DOWN** arrow key. Each volume set has a selected capacity which is less than or equal to the total capacity of the raid set on which it resides.

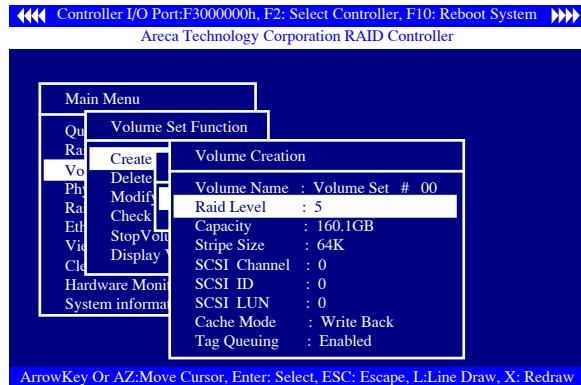
## ● Strip Size



This parameter sets the size of the segment written to each disk in a RAID 0, 1, 3, or 5 logical drive. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB.

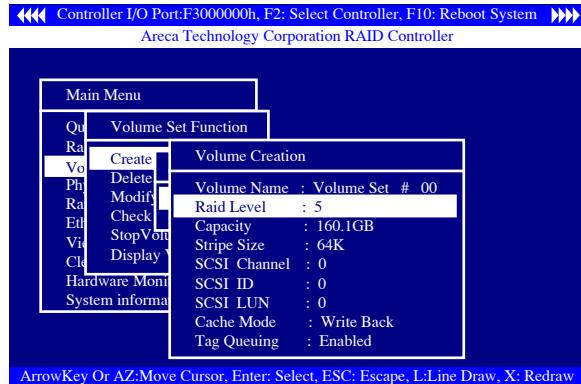
# BIOS CONFIGURATION

## ● SCSI Channel



The SATA RAID controller function is simulated to the SCSI RAID controller. The host bus is represented to the SCSI channel. Choose the SCSI Channel. A Select SCSI Channel dialog box appears, select the channel number and press **Enter** key to confirm it.

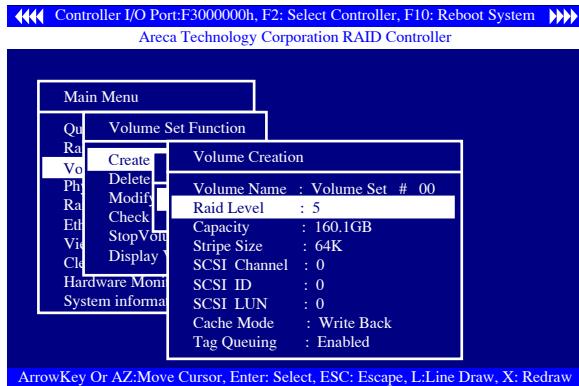
## ● SCSI ID



Each SCSI device attached to the SCSI card, as well as the card itself, must be assigned a unique SCSI ID number. A SCSI channel can connect up to 15 devices. The SATA RAID controller is as a lots of large SCSI device. We should assign an ID from a list of SCSI IDs.

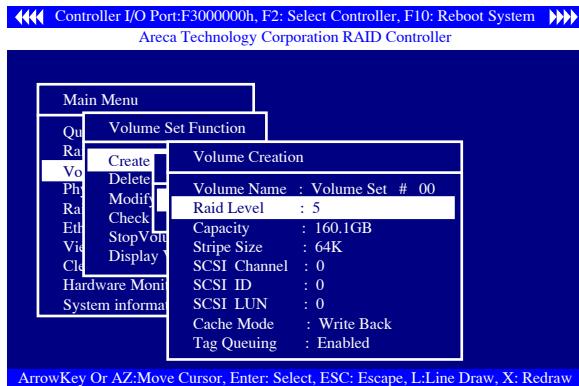
# BIOS CONFIGURATION

## ● SCSI LUN



Each SCSI ID can support up to 8 LUNs. Most SCSI controller treats each LUN like a SCSI disk.

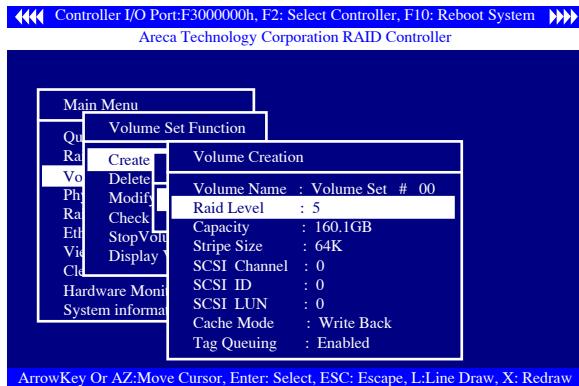
## ● Cache Mode



User can set the cache mode to: Write-Through Cache or Write-Back Cache.

## ● Tag Queuing

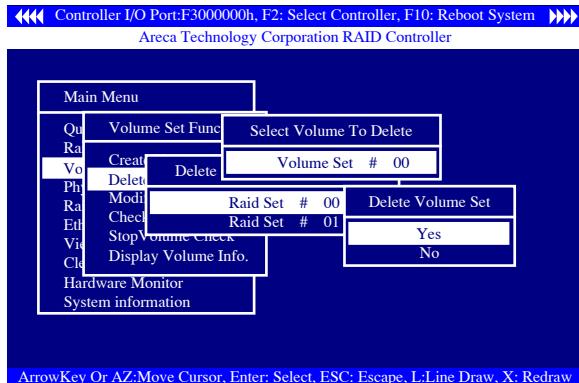
# BIOS CONFIGURATION



The Enabled option is useful for enhancing overall system performance under multi-tasking operating systems. The Command Tag (Drive Channel) function controls the SCSI command tag queuing support for each drive channel. This function should normally remain enabled. Disable this function only when using older SCSI drives that do not support command tag queuing.

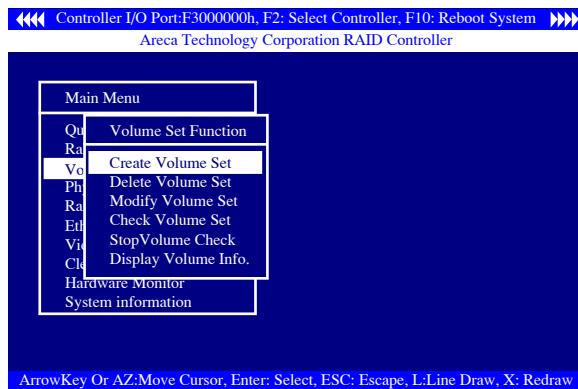
### 3.7.3.2 Delete Volume Set

To delete Volume set from raid set system function, move the cursor bar to the Volume Set Functions menu and select the Delete Volume Set item, then press **Enter** key. The Volume Set Functions menu will show all Raid Set # item. Move the cursor bar to an RAID Set number, then press **Enter** key to show all Volume Set # in the raid set. Move cursor to the deleted Volume Set number, press **Enter** key to delete it.

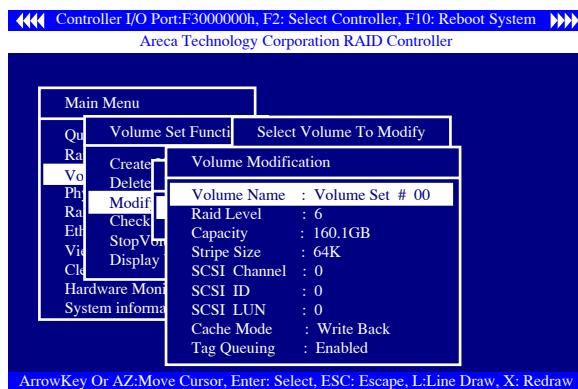


# BIOS CONFIGURATION

## 3.7.3.3 Modify Volume Set



Use this option to modify volume set configuration. To modify Volume Set values from Raid Set system function, move the cursor bar to the Volume Set Functions menu and select the Modify Volume Set item, then press **Enter** key. The Volume Set Functions menu will show all Raid Set number items. Move the cursor bar to an Raid Set number item, then press **Enter** key to show all Volume Set item Select the Volume Set from the list you which to change, press **Enter** key to modify it.



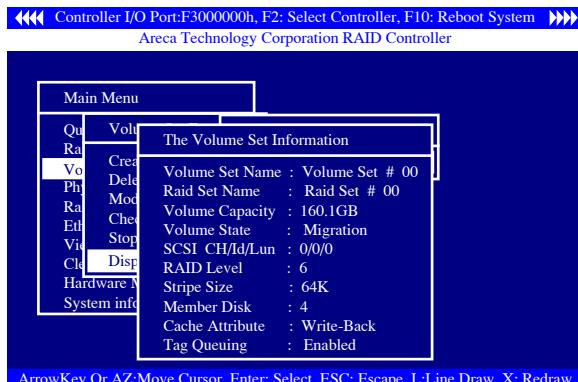
As shown in the following can be modified at this screen. Choose this option to display the properties of the selected Volume Set; you can modify all values except the capacity.

# BIOS CONFIGURATION

## ● Volume Growth

Use this raid set expands to expand a raid set, when a disk is added to your system. The expand capacity can use to enlarge the volume set size or create another volume set. The modify volume set function can support the volume set expansion function. To expand volume set capacity value from raid set system function, move the cursor bar to the volume set volume capacity item and entry the capacity size. Tick on the Confirm The Operation and click on the Submit button to complete the action. The volume set start to expand.

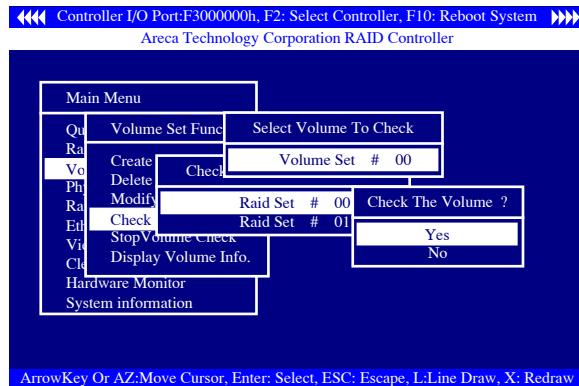
## ● Volume Set Migration



Migrating occurs when a volume set is migrating from one RAID level to another, a Volume set strip size changes, or when a disk is added to a Raid Set. Migration status is displayed in the volume status area of the Volume Set Information when one RAID level to another, a Volume set strip size changes or when a disk is added to a raid set.

# BIOS CONFIGURATION

## 3.7.3.4 Check Volume Set



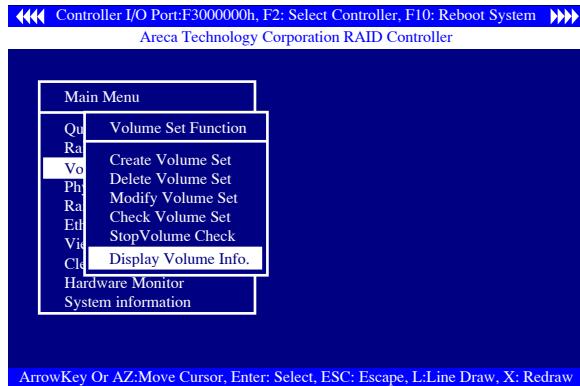
Use this option to verify the correctness of the redundant data in a volume set. For example, in a system with dedicated parity, volume set check means computing the parity of the data disk drives and comparing the results to the contents of the dedicated parity disk drive. To check Volume Set from Raid Set system function, move the cursor bar to the Volume Set Functions menu and select the Check Volume Set item, then press **Enter** key. The Volume Set Functions menu will show all Raid Set number items. Move the cursor bar to an Raid Set number item, then press **Enter** key to show all Volume Set item Select the Volume Set from the list you which to check, press **Enter** key to select it. After completing the selection, the confirmation screen appears, presses **Yes** to start check.

## 3.7.3.5 Stop Volume Set Check

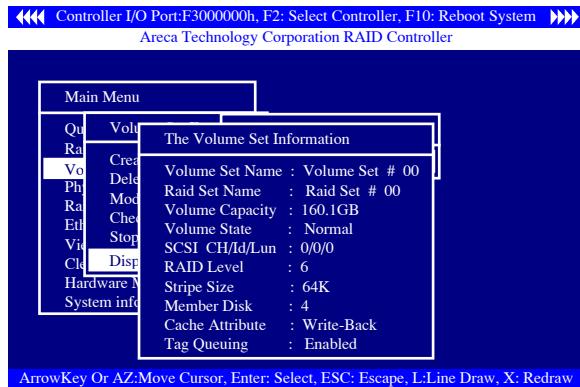
Use this option to stop all the Check Volume Set function.

# BIOS CONFIGURATION

## 3.7.3.6 Display Volume Set Info.

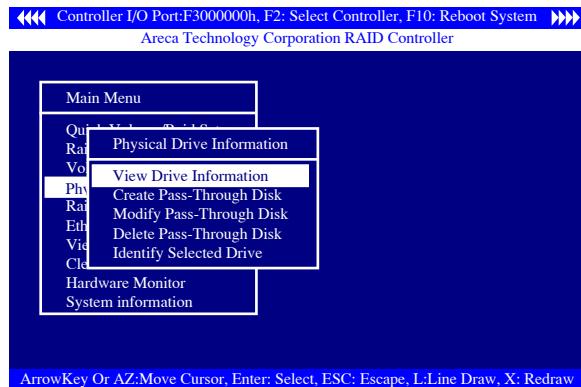


To display Volume Set information, move the cursor bar to the desired Volume Set number, then press **Enter** key. The Volume Set Information will show as following. You can only view the information of this Volume Set.



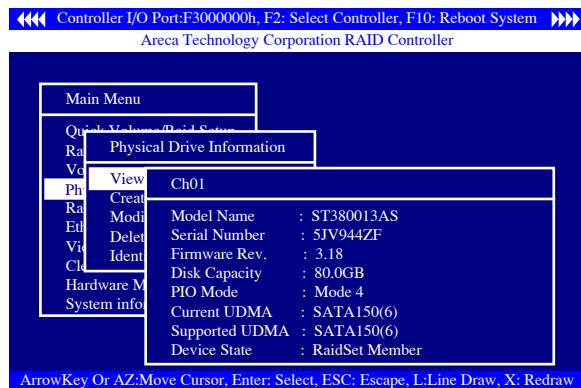
# BIOS CONFIGURATION

## 3.7.4 Physical Drives



Choose this option from the Main Menu to select a physical disk and to perform the operations listed above.

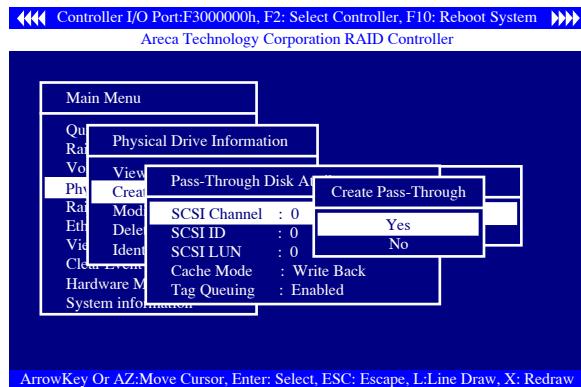
### 3.7.4.1 View Drive Information



When you choose this option, the physical disks in the SATA RAID controller are listed. Move the cursor to the desired drive and press **Enter**. The following appears:

# BIOS CONFIGURATION

## 3.7.4.2 Create Pass-Through Disk



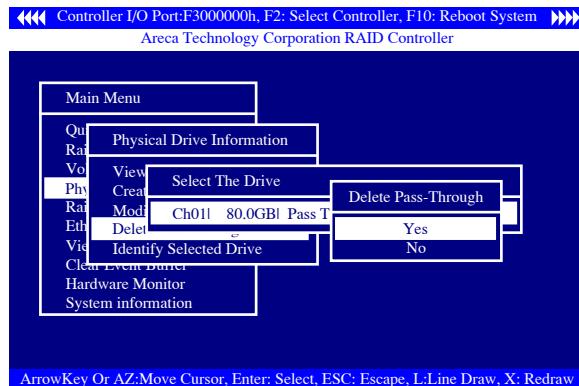
Disk is no controlled by the SATA RAID controller firmware and thus cannot be a part of a Volume Set. The disk is available to the operating system as an individual disk. It is typically used on a system where the operating system is on a disk not controlled by the SATA RAID controller firmware. The SCSI Channel, SCSI ID, SCSI LUN, Cache Mode, and Tag Queuing.

## 3.7.4.3 Modify Pass-Through Disk

Use this option to modify the Pass-Through Disk Attribute. To modify Pass-Through Disk parameters values from Pass-Through Disk pool, move the cursor bar to the Physical Drive Function menu and select the Modify Pass-Through Drive option and then press **Enter** key. The Physical Drive Function menu will show all Raid Pass-Through Drive number option. Move the cursor bar to a desired item, then press **Enter** key to show all Pass-Through Disk Attribute. Select the parameter from the list you which to change, press **Enter** key to modify it.

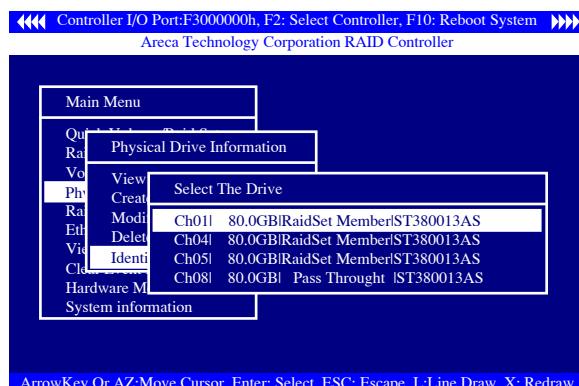
# BIOS CONFIGURATION

## 3.7.4.4 Delete Pass-Through Disk



To delete Pass-through drive from the Pass-through drive pool, move the cursor bar to the Physical Drive Function menu and select the Delete pass-through drive item, then press **Enter** key. The Delete Pass-Through confirmation screen will appear and press **Yes** key to delete it.

## 3.7.4.5 Identify Selected Drive

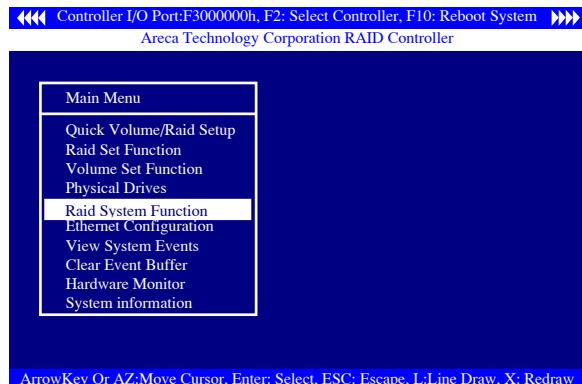


To prevent removing the wrong drive, the selected disk HDD LED Indicator will light for physically locating the selected disk when the Identify Selected Device is selected.

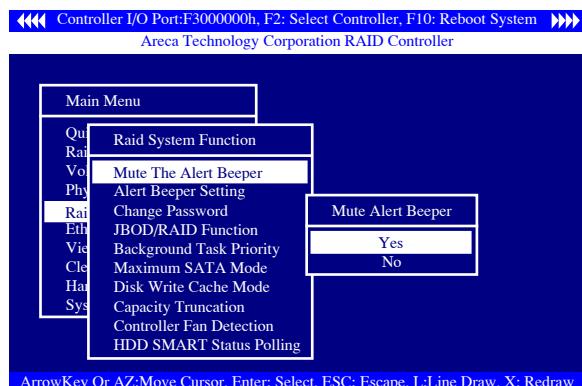
# BIOS CONFIGURATION

## 3.7.5 Raid System Function

To set the raid system function, move the cursor bar to the main menu and select the “**Raid System Function**” item and then press **Enter** key. The Raid System Function menu will show all items. Move the cursor bar to an item, then press **Enter** key to select the desired function.



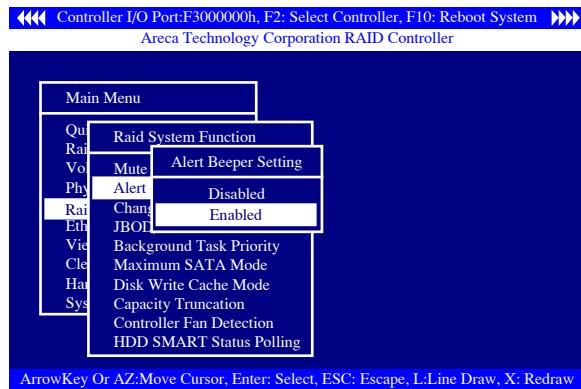
### 3.7.5.1 Mute The Alert Beeper



The Mute The Alert Beeper function item is used to control the SATA RAID controller Beeper. Select the **No** and press **Enter** key in the dialog box to turn the beeper off temporarily. The beeper will still activate on the next event.

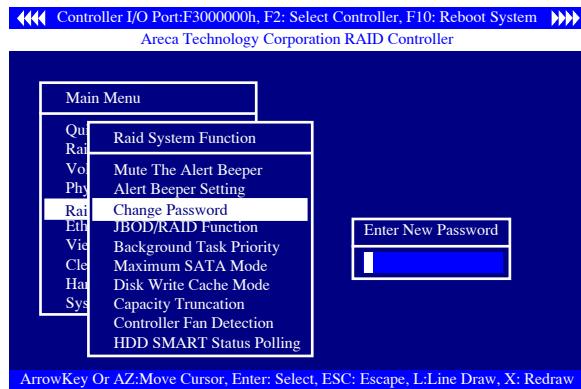
# BIOS CONFIGURATION

## 3.7.5.2 Alert Beeper Setting



The Alert Beeper function item is used to Disabled or Enable the SATA RAID controller alarm tone generator. Select the Disabled and press **Enter** key in the dialog box to turn the beeper off.

## 3.7.5.3 Change Password



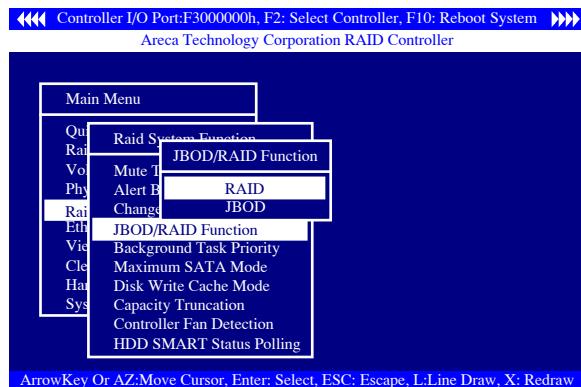
The password option allows user to set or clear the password protection feature. Once the password has been set, the user can only monitor and configure the controller by providing the correct password. This feature is used to protect the internal

# BIOS CONFIGURATION

RAID system from unauthorized entry. The controller will check the password only when entering the Main menu from the initial screen. The system will automatically go back to the initial screen when it does not receive any command in 20 seconds. To set or change the password, move the cursor to Raid System Function screen, press the Change Password item. The Enter New Password screen appears.

To disable the password, press **Enter** only in both the Enter New Password and Re-Enter New Password column. The existing password will be cleared. No password checking will occur when entering the main menu from the starting screen.

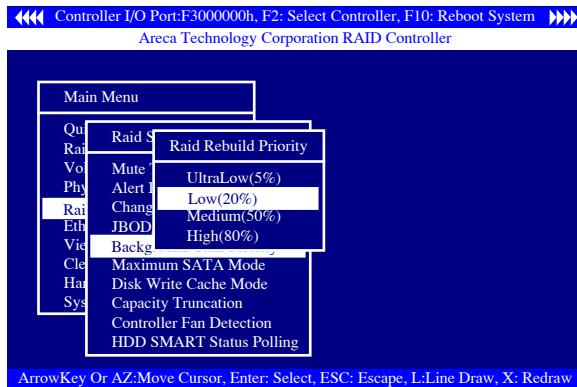
## 3.7.5.4 JBOD/RAID Function



JBOD is an acronym for “**just a Bunch Of Disk**”. It represents a volume set that is created by the concatenation of partitions on the disk. It can see all disks, when you selected the JBOD option. User needs to deleted the RAID set, when you want to change the option from the **RAID** to the **JBOD** function.

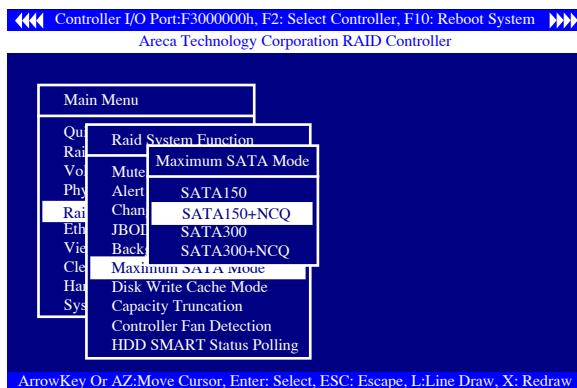
# BIOS CONFIGURATION

## 3.7.5.5 Background Task Priority



The “**Background Task Priority**” is a relative indication of how much time the controller devotes to a rebuild operation. The SATA RAID controller allows user to choose the rebuild priority (ultralow, low, normal, high) to balance volume set access and rebuild tasks appropriately.

## 3.7.5.6 Maximum SATA Mode

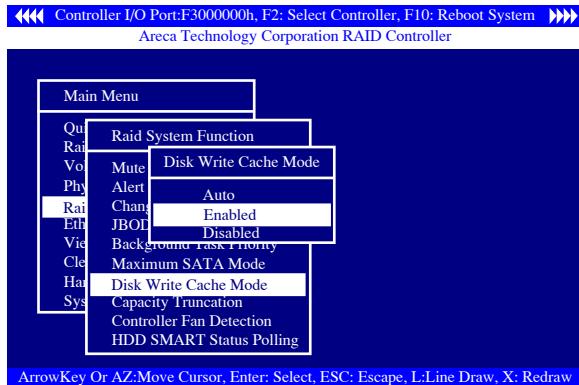


The Controller can support up to SATA II, which runs up to 300MB/s. NCQ is a command protocol in Serial ATA that can only be implemented on native Serial ATA hard drives. It allows multiple commands to be outstanding within a drive at the same time. Drives that support NCQ have an internal queue where outstanding commands can be dynamically rescheduled or re-ordered, along with the necessary tracking mechanisms

# BIOS CONFIGURATION

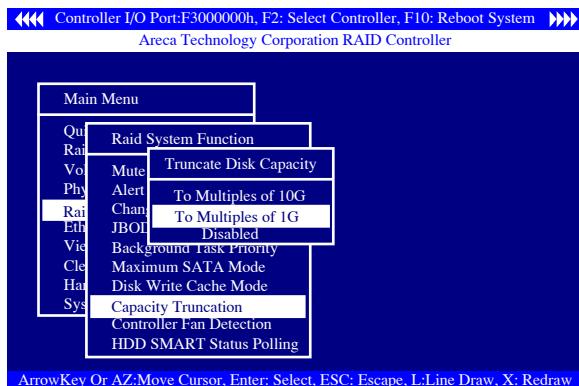
for outstanding and completed portions of the workload. The RAID Controller allows user to choose the SATA Mode: SATA150, SAT150+NCQ, SAT300, SATA300+NCQ.

## 3.7.5.7 Disk Write Cache Mode



User can set the "Disk Write Cache Mode" to: Auto, Enabled or Disabled.

## 3.7.5.8 Capacity Truncation



ARECA RAID controllers use drive truncation so that drives from differing vendors are more likely to be able to be used as spares for each other. Drive truncation slightly decreases the usable capacity of a drive that is used in redundant units.

The controller provides three truncation modes in the system configuration: **Multiples Of 10G**, **Multiples Of 1G**, and **No Truncation**.

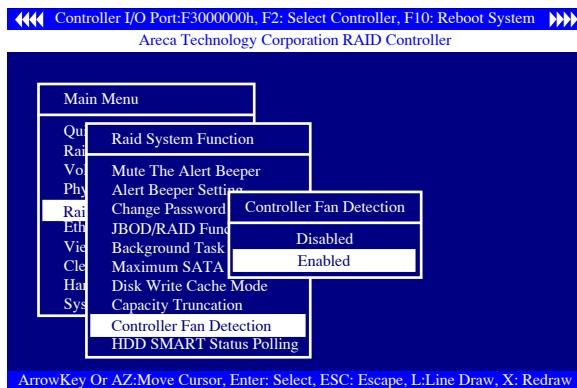
# BIOS CONFIGURATION

**Multiples Of 10G:** If you have 120 GB drives from different vendors; chances are that the capacity varies slightly. For example, one drive might be 123.5 GB, and the other 120 GB. Areca drive Truncation mode **Multiples Of 10G** uses the same capacity for both of these drives so that one could replace the other.

**Multiples Of 1G:** If you have 123 GB drives from different vendors; chances are that the capacity varies slightly. For example, one drive might be 123.5 GB, and the other 123.4 GB. Areca drive Truncation mode **Multiples Of 1G** uses the same capacity for both of these drives so that one could replace the other.

**No Truncation:** It does not truncate the capacity. Within the subsystem, the SCSI chip acts as a target and 5 SATA II bus are connected to the drive.

## 3.7.5.9 Controller Fan Detection



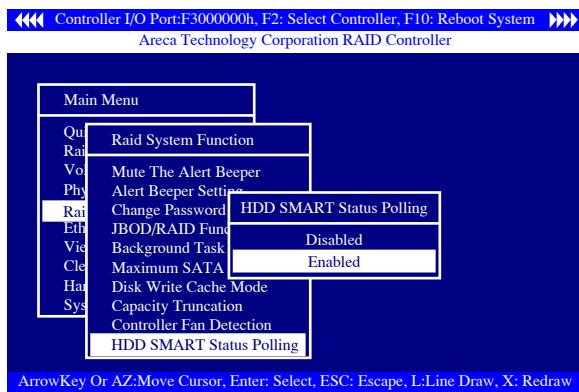
We have added, in the product box, a field replaceable passive heatsink to be used if there is enough airflow to carry out the heat in the passive heat sink.

The “Controller Fan Detection” function is available in the version 1.36 date: 2005-05-19 for preventing the Buzzer warning. Please disable the “Controller Fan Detection” function through the BIOS setting.

You can follow the following procedure to disable the Polling function. (**This function is not available in the Web Browser setting.**)

# BIOS CONFIGURATION

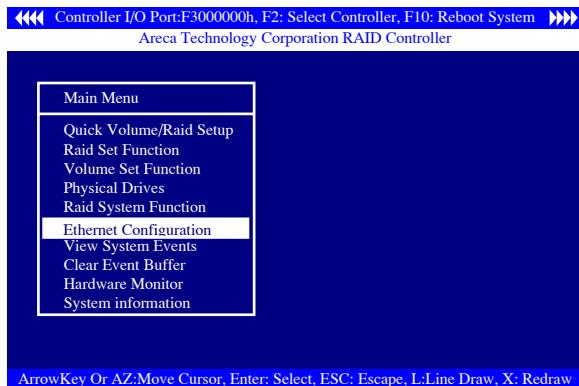
## 3.7.5.10 HDD SMART Status Polling



The external RAID has the hardware monitor in the dedicated backplane. It can report the HDD temperature status to the controller. But PCI card uses the general enclosure. The general enclosure can not report the HDD temperature to the controller. That is the reason why we add this function for customer to enable the repeat to scan the HDD temperature function in the version 1.36 date: 2005-05-19. You need to enable the "HDD SMART Status Polling" function before the function can work. This function is default disabled.

You can follow the following procedure in the BIOS setting to enable the Polling function. **(This function is not available in the Web Browser setting.)**

## 3.7.6 Ethernet Configuration (12/16/24 ports)

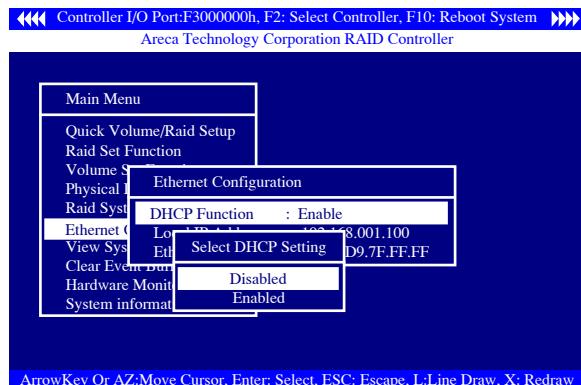


# BIOS CONFIGURATION

Use this feature to set the controller Ethernet port configuration. Customer doesn't need to create a reserved space on the arrays before the Ethernet port and HTTP service working.

## 3.7.6.1 DHCP Function

DHCP (Dynamic Host Configuration Protocol) is a protocol that lets network administrators manage centrally and automate the assignment of IP (Internet Protocol) configurations on a computer network. When using the Internet's set of protocols (TCP/IP), in order for a computer system to communicate to another computer system it needs a unique IP address. Without DHCP, the IP address must be entered manually at each computer system. DHCP lets a network administrator supervise and distribute IP addresses from a central point. The purpose of DHCP is to provide the automatic (dynamic) allocation of IP client configurations for a specific time period (called a lease period) and to eliminate the work necessary to administer a large IP network. To manually configure the IP address of the controller, move the cursor bar to the Main menu Ethernet Configuration Function item and then press the **Enter** key. The Ethernet Configuration menu appears on the screen. Move the cursor bar to DHCP Function item, then press **Enter** key to show the DHCP setting. Select the "Disabled" or "Enabled" option to enable or disable the DHCP function.

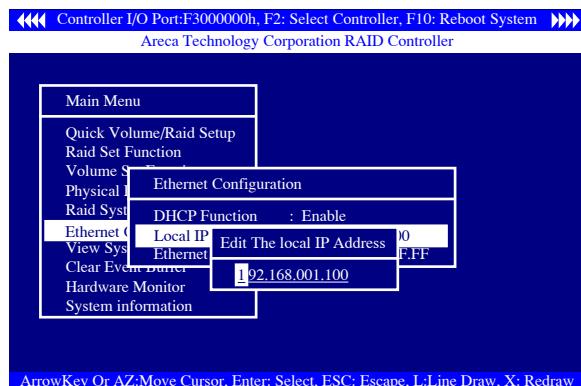


## 3.7.6.2 Local IP address

If you intend to set up your client computers manually, make

# BIOS CONFIGURATION

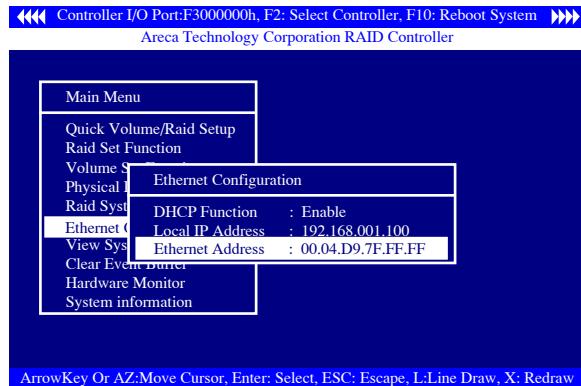
sure that the assigned IP address is in the same range of your default router address and that it is unique to your private network. However we would highly recommend that if you have a network of computers and the option to assign your TCP/IP client configurations automatically, please do. An IP address allocation scheme will reduce the time it takes to set-up client computers and eliminate the possibilities of administrative errors. To manually configure the IP address of the controller, move the cursor bar to the Main menu Ethernet Configuration Function item and then press the Enter key. The Ethernet Configuration menu appears on the screen. Move the cursor bar to Local IP Address item, then press Enter key to show the default address setting in the RAID controller. You can reassign the IP address of the controller.



## 3.7.6.3 Ethernet Address

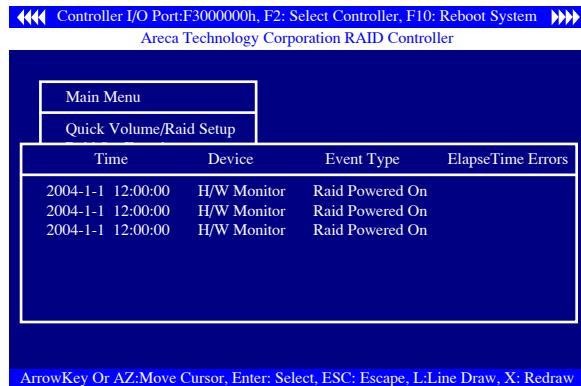
A MAC address stands for Media Access Control address and is your computer's unique hardware number. On an Ethernet LAN, it's the same as your Ethernet address. When you're connected to the Internet from the RAID controller Ethernet port, a correspondence table relates your IP address to the RAID controller's physical (MAC) address on the LAN.

# DRIVER INSTALLATION



## 3.7.7 View System Events

To view the SATA RAID controller's information, move the cursor bar to the main menu and select the View Events link, then press the **Enter** key. The SATA RAID controller's events screen appear.



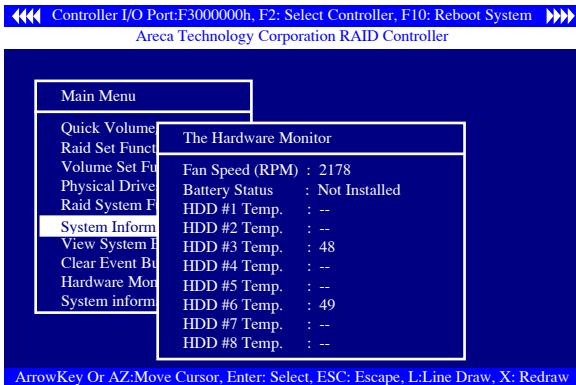
Choose this option to view the system events information: Timer, Device, Event type, Elapse Time and Errors. The RAID system does not built the real time clock. The Time information is the relative time from the SATA RAID controller power on.

## 3.7.8 Clear Events Buffer

Use this feature to clear the entire events buffer information.

## 3.7.9 Hardware Monitor

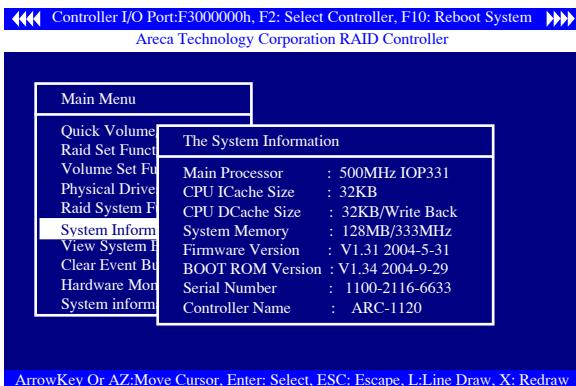
# DRIVER INSTALLATION



To view the RAID controller's hardware monitor information, move the mouse cursor to the main menu and click the Hardware Monitor link. The Hardware Information screen appears.

The Hardware Monitor Information provides the temperature, and fan speed (I/O Processor fan) of the PCI SATA RAID controller.

## 3.7.10 System Information



Choose this option to display Main processor, CPU Instruction cache and data cache size, firmware version, serial number, controller model name, and the cache memory size. To check the system information, move the cursor bar to System Information item, then press **Enter** key. All major controller system information will be displayed.

# DRIVER INSTALLATION

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## 4. Driver Installation

This chapter describes how to install the SATA RAID controller drive to your operating system. The installation procedures depend on the following terminology:

### **Installing operating system on the SATA Volume**

If you have a new drive configuration without an operating system and want to install operating system on a disk drive managed by the SATA RAID Controller. The driver installation is a part of the operating system installation.

### **Installing SATA RAID controller into an existing operating system**

The computer has an existing operating system installed and the SATA RAID controller is being installed as a secondary controller.

Have all required system hardware and software component on hand before proceeding with the setup and installation

Materials required:

- Microsoft Windows 2000/XP/2003, or Linux, and or FreeBSD installation CD-ROM
- SATA RAID Controller Diver CD-ROM
- SATA RAID controller

### **4.1 Creating the Driver Diskettes**

The SATA RAID controller shipped with CD-ROM disc is a self-booting CD. In order to created driver diskettes for Windows, Linux, and FreeBSD installation drivers. Your system required to supports bootable from CD-ROM.

If you do not have the CD-ROM disc with the package, contact your local dealer or you can also download the latest version drivers for Windows 2000/XP/2003, Linux, and FreeBSD from the ARECA web site at <http://www.areca.com.tw> .

The following steps is creating the Driver diskettes:

# **DRIVER INSTALLATION**

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1. The computer system BIOS must set to boot-up from CD-ROM.
2. Insert the SATA Controller Driver CD disc into the CD-ROM drive.
3. System will boot-up from CD-ROM Drive, to create the driver diskettes selected the "**SATA RAID controller Driver Diskette Make Utility**", and provides several screens with choices.
4. Move the highlight bar to the "**Create Driver Disk**" entry and press **Enter**.
5. The screen queries the SATA RAID controller support driver database and a list of supported driver is displayed. Move the highlight bar to the driver entry and press **Enter** for moving forward.
6. The next screen will show "**Please insert a formatted diskette into drive A:!! Press any key to continue**". Insert the formatted diskette in drive "A" and press any key to continue.
7. The window will displays the driver building message: "**Now is writing to Cylinder...**" and copy the image file from the CD-ROM to Driver Diskette.
8. The "**Write Complete !!**" message will show at the screen when the driver is build ready.

The driver diskette is now made. Proceed to the following instruction for installation procedures.

## **4.2 Driver Installation for Windows**

SATA RAID controller can be used with Microsoft Windows 2000, Windows XP, and Windows Server 2003. Windows 2003 64-bit for AMD Opteron is also supported. SATA RAID controllers supports SCSI Miniport and StorPort Drivers for Windows Server 2003.

### **4.2.1 New Storage Device Drivers in Windows Server 2003**

The Storport driver is new to Windows Server 2003. Storport implements a new architecture designed for better performance for

# DRIVER INSTALLATION

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RAID systems and in Storage Area Network (SAN) environments. Storport delivers higher I/O throughput, enhanced manageability, and an improved miniport interface. Storport better utilizes faster adapters through the use of reduced Delay Procedure Call (DPC) and improved queue management.

## 4.2.2 Install Windows 2000/XP/2003 on a SATA RAID Volume

The following instructions explain how to install the SATA RAID controller Driver. For completed details on installing Windows, see the Windows User's Manual.

### 4.2.2.1 Installation procedures

The following is the procedures for installing the SATA RAID controller driver while installing Windows 2000/XP/2003.

Boot-up Microsoft Windows 2000/XP/2003 from CD-ROM and follow the required procedure below to install SATA RAID controller:

1. Make sure you follow the instructions in Chapter 2 "**Hardware Installation**" to install the controller and connect the disk drives or enclosure.
2. Start the system and then press Tab/F6 to enable the McBIOS RAID manager. Use the McBIOS manager to create the RAID set and volume set to which you will install Windows system. For details, see Chapter 3 "**McBIOS RAID manager**". Once a volume set is created and configured, continue with next step to install the operating system.
3. Insert Windows setup CD and restart the system to begin the Windows installation.

**Note:**

The computer system BIOS must support bootable from CD-ROM.

# DRIVER INSTALLATION

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4. Press F6 when the screen shows "**Setup is inspecting your Computer's hardware Configuration**". This must be done or else the new driver installed from the SATA RAID driver diskette will not be recognized.
5. The next screen will show: "**Setup could not determine the type of one or more mass storage device installed in your system.**" Selected specify additional SCSI adapter by pressing S.
6. Window will prompt for the "**Manufacturer-supplied hardware support disk**" into floppy drive A: Insert the SATA RAID series driver diskette in drive "A:" and press **Enter**.
7. Window will check the floppy and select the correct drive and CPU type in the listing that you want to install and press **Enter** to install it.
8. After Windows scans the hardware and finds the controller, it will display:  
**"Setup will load support for the following Mass Storage devices:"**  
**"Windows 2K, XP,2K3 (ARC1XX0) SATA PCI-X (or PCI-Express) RAID Controller"**. Press **Enter** to continue and copy the driver files.  
At this point, simply follow the Microsoft Windows installation procedure.  
Follow the on-screen instructions, responding as needed to complete the installation.
9. After the installation is completed, reboot the system to load the new drivers.
10. See Chapter 5 in this manual to customize your RAID volume sets using Storage manager.

## 4.2.2.2 Making Volume Sets Available to Windows System

When you reboot the system, log in as system administrator. Continue with the following steps to make any new volume sets

# DRIVER INSTALLATION

---

or pass-through disks accessible to Windows. This procedure assumes that the SATA RAID controller hardware, driver, and Windows are installed and operational in your system.

1. Partition and format the new volume set or disks using Disk Administrator:
  - a. Choose Administrative Tools from the Start menu.
  - b. Choose Computer Management from the Administrative Tools menu.
  - c. Select Storage.
  - d. Select Disk Management.
2. Follow the on-screen prompts to write a signature to the drive.
3. Right click on the disk drive and select Create Volume from the menu.
4. Follow the on-screen prompts to create a volume set and to give a disk drive letter.

## **4.2.3 Install controller into an existing Windows 2000/XP/2003**

In this scenario, you are installing the controller in a new Windows system. To install the driver:

1. Follow the instructions in Chapter 2 **Hardware Installation** Chapter to install the controller and connect the disk drives or enclosure.
2. Start the system and then press Tab/F6 to enter the McBIOS-based configuration utility. Use the configuration utility to create the raid set and volume set. For details, see Chapter 3 **McBIOS RAID Manager**. Once a volume set is created and configured, continue with install the driver.
3. Re-Boot Windows and OS will recognizes the SATA RAID Controller and launches the “**Found New Hardware Wizard**”, which guides you in installing the SATA RAID driver.

# DRIVER INSTALLATION

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4. The “**Upgrade Device Driver Wizard**” popup and provides a choice for the wizard to select. Choose “**Display a list of known drivers for this device, so that you can choose a specific driver.**” and click on **Next**.
5. When the next screen queries the user about utilizing the currently installed driver, click on **Have Disk** button.
6. When the “**Install From Disk**” dialog appears, insert the SATA RAID controller driver diskette or the ship CD-ROM and type the correct path name in the “**Copy manufacturer’s files from:**”
7. The previous dialog box appears with the selected driver displayed as of the driver to install. Then click on **Next**.
8. The “**Digital Signature Not Found**” screen appears. Click on **Yes** to continue the installation.
9. Windows automatically copies the appropriate driver files and rebuilds its driver database.
10. The “**Found New Hardware Wizard**” summary screen appears Click on the **Finish** button.
11. The “**System Settings Change**” dialog box appears. Remove the diskette from the drive and click on **Yes** to restart the computer to load the new drivers.
12. See Chapter 5 in this manual to customize your RAID volumes using Storage manager.

## 4.2.3.1 Making Volume Sets Available to Windows System

When you reboot the system, log in as system administrator. Continue with the following steps to make any new disk arrays or independent disks accessible to Windows 2000/XP/2003. This procedure assumes that the SATA RAID controller hardware, driver, and Windows are installed and operational in your system.

# DRIVER INSTALLATION

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1. Partition and format the new arrays or disks using Disk Administrator:
  - a. Choose Administrative Tools from the Start menu.
  - b. Choose Computer Management from the Administrative Tools menu.
  - c. Select Storage.
  - d. Select Disk Management.
2. Follow the on-screen prompts to write a signature to the drive.
3. Right click on the drive and select Create Volume from the menu.
4. Follow the on-screen prompts to create a volume set and to give a disk drive letter.

## 4.2.4 Uninstall controller from Windows 2000/XP/2003

To remove the SATA RAID controller driver from the Windows system follow the instructions below.

1. Ensure that you have closed all applications and are logged in with administrative rights.
2. Open **Control Panel** and start the **Add/Remove Program** icon.
3. Select the SATA RAID controller driver and click on **OK**.
4. Click on **Yes** to confirm removing the SATA RAID driver. The Uninstall shield program will start removing files and display a progress bar. After the programs have been completely removed from your system, the uninstall shield program will show a summary of files removed and updates completed while removing files from the system. It will also recommend that the user restart the system.

# DRIVER INSTALLATION

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## 4.3 Driver Installation for Linux

This chapter describes how to install the SATA RAID controller drive to your Red Hat Linux, and SuSE Linux.

Before installing the SATA RAID driver to the Linux, you must have done the following action:

1. Install and configure the controller and hard disk drives according to the instructions in Chapter 2 **Hardware Installation**.
2. Start the system and then press Tab/F6 to enter the McBIOS RAID manager configuration utility. Use the BIOS configuration utility to create the raid set and volume set. For details, see Chapter 3 **McBIOS RAID Manager**.

If you are using a Linux distribution for which there is not a compiled driver available from ARECA, you can copy the source from the SATA software CD or download the source from the ARECA website and compile a new driver.

Compiled and tested drivers for Red Hat and SuSE Linux are included on the ship CD. You can download the updated version compiled and tested driver for Red Hat or SuSE Linux from the ARECA web site at <http://www.areca.com.tw>. Included in these downloads is the Linux driver source, which you can use to compile the updated version driver for RedHat, SuSE, and other versions of Linux.

Please refer to the “**readme.txt**” file on the ARECA ship CD-ROM or website to make driver diskette and to install driver to the system.

## 4.4 Driver Installation for FreeBSD

This chapter describes how to install the SATA RAID controller drive to your FreeBSD.

Before installing the SATA RAID driver to the FreeBSD, you must do the following action:

1. Install and configure the controller and hard disk drives according to the instructions in Chapter 2 **Hardware Installation**
2. Start the system and then press Tab/F6 to enter the **McBIOS RAID Manager** configuration utility. Use the BIOS configuration utility to create the raid set and volume set. For details, see Chap-

# DRIVER INSTALLATION

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## ter 3 **McBIOS RAID Manager**.

The ship CD-ROM that came with the SATA RAID controller includes compiled and tested drivers for FreeBSD 4.x (4.2 and onwards) and 5.x (5.2 and onwards). To check if a more updated version driver is available, please see the ARECA web site <http://www.areca.com.tw>.

Please refer to the “**readme.txt**” file on the SATA RAID controller software CD-ROM or website to make driver diskette and to install driver to the system.

# INSTALLATION ARCHTTP PROXY SERVER

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## 5. Installation ArcHttp Proxy Server

### Overview

After the hardware installation, the SATA disk drives connected to the SATA RAID controller must be configured and the volume set units initialized before they are ready to use.

Those user interfaces can access the built-in configuration and administration utility that resides in the controller's firmware. They provide complete control and management of the controller and disk arrays, eliminating the need for additional hardware or software.

The software utility refers to SATA RAID controller software on the CD-ROM delivered with your system. This CD-ROM contains the software utility that is required for the monitor, test, and support of SATA RAID controller. The software utility and McRAID storage manager can configure and monitor the SATA RAID controller via ArcHttp Proxy Server. The following table outlines their functions:

Configuration Utility	Operating System supported
McBIOS RAID Manager	OS-Independent
McRAID Storage Manager (Via Archtp proxy server)	Windows 2000/XP/2003, Linux and FreeBSD
SAP Monitor (Single Admin portal to scan for multiple RAID units in the network, Via ArcHttp Proxy Server)	Windows 2000/XP/2003 Java based for Windows. Linux and FreeBSD (available in Q2, 2005)
SNMP Manager Console Integration (Via ArcHttp Proxy Server)	Windows 2000/XP/2003, Linux. FreeBSD (available in Q2, 2005)

### 5.1 For Windows

You must have administrative level permission to install SATA RAID software. This procedure assumes that the SATA RAID hardware and windows are installed and operational in your system.

Screen in this section are taken from a Windows/XP installation.

If you are running other Windows, your installing screen may look different, but the ArcHttp proxy server installation is essentially the same.

1. Insert the RAID subsystem CD in the CD-ROM drive.
2. Run the setup.exe file that resides at: <CD-ROM>\windows\http\setup.exe on the CD-ROM.

# INSTALLATION ARCHTP PROXY SERVER

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3. Click on the Setup file then the Welcome screen appears.



Follow the on-screen prompts to complete ArcHttp Proxy Server software installation.

A program bar appears that measures the progress of the ArcHttp setup. When this screen complete, you have completed the ArcHttp Proxy Server software setup.

4. After a successful installation, the Setup Complete dialog box of the installation program is displayed.

Click the **Finish** button to complete the installation.



5. See next chapter in the McRAID storage manager to customize your RAID volume set.

## 5.2 For Linux

You must have administrative level permission to install SATA RAID software. This procedure assumes that the SATA RAID hardware and Linux are installed and operational in your system.

The following is the Linux installation procedure in the SATA RAID controller system.

1. Insert the SATA RAID controller CD in the CD-ROM drive.

# INSTALLATION ARCHTTP PROXY SERVER

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2. Run the ArcHttpPci file that resides at: <CD-ROM>\linux\http\ on the CD-ROM.

Usage: ArcHttpPci TCP\_PORT

Parameters: TCP\_PORT value = 1 ~ 65535

For Example:

Start the ArcHttp Proxy Server for TCP\_PORT = 6666, user can type "ArcHttpPci 6666" on command line and enter to execute it.

3. See next chapter in the McRAID storage manager to customize your RAID volume set.

**Note:**

For RedHat Users: upgrade Mozilla Browser to Version 1.6 or later.

# WEB BROWSER-BASED CONFIGURATION

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## 6. Web Browser-based Configuration

Before using the McRAID firmware-based browser utility, do the initial setup and installation of this product. If you need to boot up the operating system from a RAID volume set, you must first create a RAID volume by using **McBIOS RAID Manager**. Please refer to section 3.3 **Using Quick Volume /Raid Setup Configuration** for information on creating this initial volume set.

The McRAID manager is firmware-based utility, which utilizes the browser installed on your operating system. The McRAID Manager program is an HTML-based application, which utilizes the browser (IE, Netscape and Mozilla etc) installed on your monitor station. It allows user through web browser to create and modify RAID set, volume set, and monitor SATA RAID Controller status. Use this utility to:

- Create raid set
- Expand raid set
- Define volume set
- Add physical drive
- Modify volume set
- Modify RAID level/stripe size
- Define pass-through disk drives
- Modify system function
- Update firmware
- Designate drives as hot spares

### 6.1 Start-up McRAID Manager for Local Administration

With McRAID Storage Manager, you can Local manage a system containing a SATA RAID controller that has Windows or Linux and a supported browser.

A locally managed system requires all of the following components:

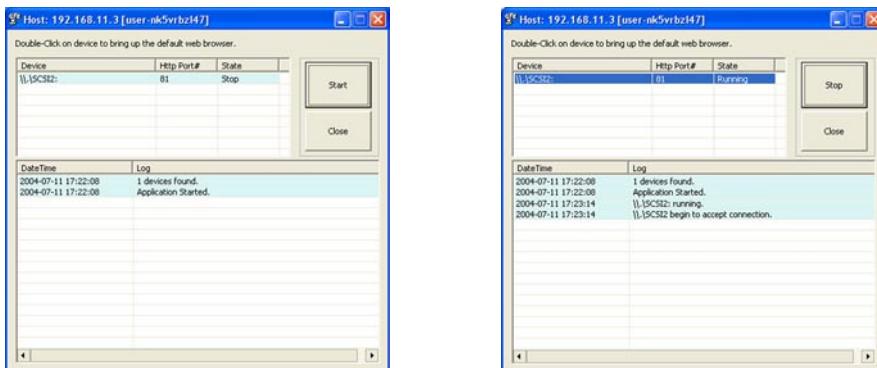
- A supported Web browser, which should already be installed on the system.
- Installing an ArcHttp proxy server on the SATA RAID system.

# WEB BROWSER-BASED CONFIGURATION

## 6.1.1 For Windows

Screen in this section are taken from a Windows/XP installation. If you are running other Windows, your installing screen may look different, but the ArcHttp proxy server installation is essentially the same.

1. Click on the **Start** Button in the Windows 2000/XP task bar and then click **Program**, select the **ArcHttp Proxy Server** and run “**ArcHttp Proxy Server**”. The ArcHttp dialog box appears. If user doesn’t want to launch the web browser, goes to step 4.



2. To start the ArcHttp Proxy Server web-browser management, click the **Start** Button.



The Enter Network Password dialog screen appears, type the User Name and Password. The RAID subsystem controller default User Name is “**admin**” and the Password is “**0000**”. After completing entering user name and password, press Enter to start-up the ArcHttp Proxy Server.

# WEB BROWSER-BASED CONFIGURATION

3. The Storage Console current configuration screen displays the current configuration of your RAID subsystem.



The screenshot shows the Storage Console interface. On the left is a navigation menu with the following items:

- ④ Quick Function
- ④ RaidSet Functions
- ④ VolumeSet Functions
- ④ Physical Drives
- ④ System Controls
- ④ Information

The main area displays the "Raid Set Hierarchy" and "IDE Channels".

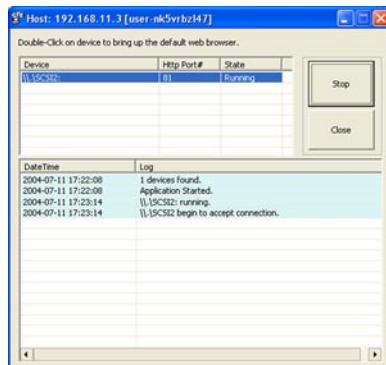
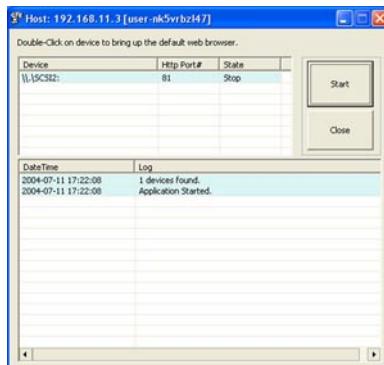
**Raid Set Hierarchy:**

Raid Set	IDE Channels	Volume Set (Ch/Lun)	Volume State	Capacity
Raid Set #00	Ch05	Volume Set #00 (0:0:0)	Normal	160.0GB
	Ch06			
	Ch07			
	Ch08			

**IDE Channels:**

Channel	Usage	Capacity	Model
Ch01	N.A.	N.A.	N.A.
Ch02	N.A.	N.A.	N.A.
Ch03	N.A.	N.A.	N.A.
Ch04	N.A.	N.A.	N.A.
Ch05	Raid Set #00	30.0GB	ST380013AS
Ch06	Raid Set #00	30.0GB	ST380013AS
Ch07	Raid Set #00	30.0GB	ST380013AS
Ch08	Raid Set #00	30.0GB	ST380013AS

4. If you don't default start-up the web browser, clear "**The Launch Web Browser when server started!!**" setting. To start the ArcHttp Proxy Server web-browser management, click the **Start** button.



9. User may execute the ArcHttp proxy server by entering [http://\[IP Address\]](http://[IP Address]) in your web browser.

# WEB BROWSER-BASED CONFIGURATION

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## 6.1.2 For Linux

Execute the ArcHttp proxy server by entering [http://\[IP Address\]](http://[IP Address]) in the Netscape browser provided with Linux. Note that Linux prompts you to login to the machine with an ID of root. The SATA RAID controller default User Name (ID) is “**admin**” and the Password is “**0000**”

## 6.2 Start-up McRAID Manager for Remote Administration

You can manage a system remotely from a system that does not contain a SATA RAID controller.

A remotely managed system requires all of the following components:

- The remote system must contain a web browser.
- The managed system must contain a McRAID storage manager.
- Installing an ArcHttp proxy server on the managed system.
- Remote and managed systems must have a TCP/IP connection.

### 6.2.1 Microsoft Windows System

To configure internal SATA RAID controller on a remote machine, you need to know its IP Address. You must first start up your local ArcHttp Proxy Server. (Please reference this chapter section 6.1.1).

(1).Launch your ArcHttp Proxy Server by entering [http://\[IP Address\]](http://[IP Address]) in the remote web browser.

(2). When connection to the remote system is established, the System Login screen appears. The SATA RAID controller default User Name is “**admin**” and the Password is “**0000**”

#### **Note:**

That you must be logged in as administrator with local admin rights on the remote machine to remotely configure it.

# WEB BROWSER-BASED CONFIGURATION

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## 6.2.2 Linux System

To configure SATA RAID controller on a remote machine, you need to know its IP Address. You must first start up your local ArcHttp proxy server. (Please reference this chapter section 6.1.1).

(1).Launch your ArcHttp proxy server by entering [http://\[IP Address\]](http://[IP Address]) in the remote web browser.

(2). When connection to the remote system is established, the System Login screen appears. The SATA RAID controller default User Name is “**admin**” and the Password is “**0000**”

**Note:**

That you must be logged in as administrator with local admin rights on the remote machine to remotely configure it.

## 6.3 SATA RAID controller McRAID storage manager

The McRAID storage manager current configuration screen displays the current configuration of your SATA RAID controller. It displays the Raid Set List, Volume Set List and Physical Disk List. The raid set information, volume set information and drive information can also be viewed by clicking on the RaidSet Hierarchy screen. The current configuration can also be viewed by clicking on RaidSet Hierarchy in the menu.

# WEB BROWSER-BASED CONFIGURATION

To display raid set information, move the mouse cursor to the desired raid set number, then click it. The raid set Information will show in the screen.

To display volume set information, move the mouse cursor to the desired Volume Set number, then click it. The volume set Information will show in the screen.

To display drive information, move the mouse cursor to the desired physical drive number, then click it. The drive Information will show in the screen.

## 6.4 Main Menu

The Main Menu shows all function that enables the customer to execute actions by clicking on the appropriate link.

Individual Category	Description
Quick Function	Create a default configuration, which is based on the number of physical disk installed; it can modify the volume set Capacity, Raid Level, and Stripe Size.
RaidSet Functions	Create a customized raid set
VolumeSet Functions	Create customized volume sets and modify the existed volume sets parameter.

# WEB BROWSER-BASED CONFIGURATION

Physical Drives	Create pass through disks and modify the existed pass through drives parameter. It also provides the function to identify the respect disk drive.
System Controls	Setting the raid system configurations
Information	View the controller information. The Raid Set Hierarchy can also view through the RaidSet Hierarchy item.

## 6.5 Quick Function

The screenshot shows a web-based configuration interface for RAID volume sets. On the left, a sidebar lists various functions: Quick Function (Quick Create), RaidSet Functions, VolumeSet Functions, Physical Drives, System Controls, and Information. The 'Quick Create' link is highlighted. The main content area has a header 'Areca Technology Corporation' with a logo. Below the header is a form titled 'Quick Create Raid Volume Set'. The form includes fields for 'Total Number Of Disks' (set to 4), 'Select Raid Level' (set to Raid 6), 'Maximum Capacity Allowed' (set to 160.1 GB), 'Select Capacity' (set to 160.1 GB), 'Volume Initialization Mode' (set to Foreground Int (Faster Completion)), and 'Select Stripe Size' (set to 64 KB). There is also a checked checkbox for 'Confirm The Operation'. At the bottom of the form are 'Submit' and 'Reset' buttons.

The number of physical drives in the SATA Raid controller determines the RAID levels that can be implemented with the raid set. You can create a raid set associated with exactly one volume set. The user can change the raid level, stripe size, and capacity. A hot spare option is also created depending upon the existing configuration.

Tick on the Confirm The Operation and click on the Submit button in the Quick Create screen, the raid set and volume set will start to initialize.

Note: In Quick Create your volume set is automatically configured based on the number of disks in your system. Use the Raid Set Function and Volume Set Function if you prefer to customize your system.

# WEB BROWSER-BASED CONFIGURATION

## 6.6 RaidSet Functions

Use the Raid Set Function and Volume Set Function if you prefer to customize your system. User manual configuration can full control of the raid set setting, but it will take longer to complete than the Quick Volume/Raid Setup configuration. Select the Raid Set Function to manually configure the raid set for the first time or deletes existing raid set and reconfigures the raid set. A raid set is a group of disks containing one or more volume sets.

### 6.6.1 Create Raid Set



The screenshot shows a web-based RAID configuration interface. On the left, a sidebar menu lists 'Quick Function', 'RaidSet Functions' (which is selected and highlighted in green), 'VolumeSet Functions', 'Physical Drives', 'System Controls', and 'Information'. The main content area is titled 'Area Technology Corporation' and displays a sub-menu 'Select The IDE Drives For RAID Set'. This sub-menu includes a table with columns 'Select', 'Channel', 'Capacity', and 'Model'. Four IDE drives are listed: IDE Ch05 (30.0GB, ST380013AS), IDE Ch06 (30.0GB, ST380013AS), IDE Ch07 (30.0GB, ST380013AS), and IDE Ch08 (30.0GB, ST380013AS). Below the table, there is a 'Raid Set Name' input field containing 'Raid Set #00' and a 'Confirm The Operation' checkbox. At the bottom of the sub-menu are 'Submit' and 'Reset' buttons.

To create a raid set, click on the Delete Raid Set link. A "Select The IDE Drive For RAID Set" screen is displayed showing the IDE drive connected to the current controller. Click on the selected physical drives with the current raid set. Enter 1 to 15 alphanumeric characters to define a unique identifier for a raid set. The default raid set name will always appear as Raid Set. #. Tick on the Confirm The Operation and click on the Submit button in the screen, the raid set will start to initialize.

### 6.6.2 Delete Raid Set

To delete a raid set, click on the Create Raid Set link. A "Select The RAID SET To Delete" screen is displayed showing all raid set existing in the current controller. Click the raid set number

# WEB BROWSER-BASED CONFIGURATION

you which to delete in the select column to delete screen. Tick on the Confirm The Operation and click on the Submit button in the screen to delete it.

Select	Raid Set Name	Member Disks	Capacity
<input checked="" type="radio"/>	Raid Set # 00	4	320.1GB

## 6.6.3 Expand Raid Set

Use this option to expand a raid set, when a disk is added to your system. This function is active when at least one drive is available.

Select	Channel	Capacity	Model
<input checked="" type="checkbox"/>	IDE Ch06	30.0GB	ST380013AS

To expand a raid set, click on the Expand Raid Set link. Select the target raid set, which you want to expand it.

Tick on the available disk and Confirm The Operation, and then click on the Submit button in the screen to add disks to the raid set.

## 6.6.4 Activate Incomplete Raid Set

When one of the disk drive is removed in power off state, the raid set state will change to Incomplete State. If user wants to contin-

# WEB BROWSER-BASED CONFIGURATION

ue to work, when the SATA RAID controller is power on. User can use the Activate Raid Set option to active the raid set. After user complete the function, the Raid State will change to Degraded Mode.

To activate the incomplete the raid set, click on the Activate Raid Set link. A "Select The RAID SET To Activate" screen is displayed showing all raid set existing in the current controller. Click the raid set number you which to activate in the select column.

Select	Raid Set Name	Member Disks	Capacity
<input checked="" type="radio"/>	Raid Set # 00	2	160.1GB
<input type="radio"/>	Raid Set # 01	2	160.1GB

Click on the Submit button in the screen to activate the raid set that has removed one of disk drive in the power off state. The SATA RAID controller will continue to work in degraded mode.

## 6.6.5 Create Hot Spare

Select	Channel	Capacity	Model
<input checked="" type="checkbox"/>	IDE Ch07	30.00GB	ST300013AS
<input type="checkbox"/>	IDE Ch08	30.00GB	ST300013AS

When you choose the Create Hot Spare option in the Raid Set Function, all unused physical devices connected to the current controller appear:

Select the target disk by clicking on the appropriate check box. Tick on the Confirm The Operation, and click on the Submit button in the screen to create the hot spares.

The create Hot Spare option gives you the ability to define a global hot spare.

# WEB BROWSER-BASED CONFIGURATION

## 6.6.6 Delete Hot Spare

Select the target Hot Spare disk to delete by clicking on the appropriate check box.

Tick on the Confirm The Operation, and click on the **Submit** button in the screen to delete the hot spares.

## 6.6.7 Rescue Raid Set

When the system is power off in the Raidset update period, it may be disappeared in this abnormal condition. The “**RESCUE**” function can recover the missing RaidSet information.

The RAID controller uses the time as the RaidSet signature. The RaidSet may have different time after the RaidSet is recovered.

The “**SIGANT**” function can regenerate the signature for the RaidSet.

The screenshot shows a web-based configuration interface for an Areca Technology Corporation RAID controller. The left sidebar contains a navigation menu with sections for Quick Function, RaidSet Functions (Create RaidSet, Delete RaidSet, Expand RaidSet, Activate RaidSet, Create Hot Spare, Delete Hot Spare, Recover Raid Set), VolumeSet Functions, Physical Drives, System Controls, and Information. The main content area is titled 'TRY TO RESCUE MISSING RAIDSET' and includes fields for 'Enter The Keyword' and 'Confirm The Operation', along with 'Submit' and 'Reset' buttons. The interface is designed for managing RAID sets and recovering missing information.

## 6.7 Volume Set Functions

A volume set is seen by the host system as a single logical device. It is organized in a RAID level with one or more physical disks.

RAID level refers to the level of data performance and protection of a volume set. A volume set capacity can consume all or a portion of the disk capacity available in a raid set. Multiple volume sets can exist on a group of disks in a raid set. Additional volume sets created in a specified raid set will reside on all the physical disks in the raid set. Thus each volume set on the raid set will have its data spread evenly across all the disks in the raid set.

# WEB BROWSER-BASED CONFIGURATION

## 6.7.1 Create Volume Set

1. Volume sets of different RAID levels may coexist on the same raid set.
2. Up to 16 volume sets in a raid set can be created by the SATA RAID controller.
3. The maximum addressable size of a single volume set is 2 TB(32-bit mode).

To create volume set from raid set system, move the cursor bar to the main menu and click on the Create Volume Set link. The Select The Raid Set To Create On It screen will show all raid set number. Tick on a raid set number that you want to create and then click on the Submit button.

The new create volume set allows user to select the Volume name, capacity, RAID level, strip size, SCSI ID/LUN, Cache mode and tag queuing.



Areca Technology Corporation

Enter Volume Attribute On Raid Set #00

Volume Name	Volume Set #00
Member Disks	4
Volume Raid Level	Raid 6
Max Capacity Allowed	160.1 GB
Select Volume Capacity	160.1 GB
Volume Initialization Mode	Foreground Init (After Completion)
Volume Stripe Size	64 KB/Byte
Volume Cache Mode	Write Back
Tagged Command Queuing	Enabled
SCSI Channel/SCSI ID/SCSI Lun	0, 0, 0

Confirm The Operation

Submit  Reset

### ● Volume Name

The default volume name will always appear as Volume Set. #. You can rename the volume set name providing it does not exceed the 15 characters limit.

### ● Capacity

The maximum volume size is default in the first setting. Enter the appropriate volume size to fit your application.

### ● Raid Level

Set the RAID level for the Volume Set. Highlight Raid Level and press Enter.

# WEB BROWSER-BASED CONFIGURATION

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The available RAID levels for the current Volume Set are displayed. Select a RAID level and press Enter to confirm.

## ● Strip Size

This parameter sets the size of the stripe written to each disk in a RAID 0, 1, (10), 5 or 6 logical drive. You can set the stripe size to 4 KB, 8 KB, 16 KB, 32 KB, 64 KB, or 128 KB.

A larger stripe size produces better-read performance, especially if your computer does mostly sequential reads. However, if you are sure that your computer does random reads more often, select a small stripe size

Note: RAID level 3 can't modify strip size.

## ● Cache Mode

The SATA RAID controller supports Write-Through Cache and Write-Back Cache.

## ● SCSI Channel/SCSI ID/SCSI Lun

SCSI Channel: The SATA RAID controller function is simulated to the SCSI RAID controller. The host bus is represented to the SCSI channel. Choose the SCSI Channel.

SCSI ID: Each SCSI device attached to the SCSI card, as well as the card itself, must be assigned a unique SCSI ID number. A SCSI channel can connect up to 15 devices. The SATA RAID controller is as a lots of large SCSI device. We should assign an ID from a list of SCSI IDs.

SCSI LUN: Each SCSI ID can support up to 8 LUNs. Most SCSI controller treats each LUN like a SCSI disk.

## ● Tag Queuing

The Enabled option is useful for enhancing overall system performance under multi-tasking operating systems. The Command Tag (Drive Channel) function controls the SCSI command tag queuing support for each drive channel. This function should normally remain enabled. Disable this function only when using older SCSI drives that do not support command tag queuing

## 6.7.2 Delete Volume Set

To delete Volume from raid set system function, move the cursor

# WEB BROWSER-BASED CONFIGURATION

bar to the main menu and click on the Delete Volume Set link. The Select The Raid Set To Delete screen will show all raid set number. Tick on a raid set number and the Confirm The Operation and then click on the Submit button to show all volume set item in the selected raid set. Tick on a volume set number and the Confirm The Operation and then click on the Submit button to delete the volume set.

Select	Volume Set Name	On Raid Set	Capacity
<input checked="" type="radio"/>	Volume Set #00	Raid Set #00	160.0GB

## 6.7.3 Modify Volume Set

To modify a volume set from a raid set:

- (1). Click on the Modify Volume Set link.
- (2). Tick on the volume set from the list that you wish to modify. Click on the **Submit** button.

The following screen appears.

Use this option to modify volume set configuration. To modify volume set attribute values from raid set system function, move the cursor bar to the volume set attribute menu and click on it. The modify value screen appears. Move the cursor bar to an attribute item, and then click on the attribute to modify the value. After you complete the modification, tick on the Confirm The Operation

Volume Name	Volume Set #00
Max Capacity Allowed	160.0 GB
Volume Capacity	160.0 GB
Volume Initialization Mode	Foreground for Faster Completion
Volume Raid Level	Raid 6
Volume Stripe Size	64 KB
Volume Cache Mode	Write Back
Tagged Command Queuing	Enabled
SCSI Channel SCSI ID SCSI Lnn	0 0 0

# WEB BROWSER-BASED CONFIGURATION

and click on the Submit button to complete the action. User can modify all values except the capacity.

## 6.7.3.1 Volume Set Migration

Migrating occurs when a volume set is migrating from one RAID level to another, a volume set strip size changes, or when a disk is added to a raid set. Migration status is displayed in the volume status area of the RaidSet Hierarchy screen when one RAID level to another, a Volume set strip size changes or when a disk is added to a raid set.

Raid Set	IDE Channels	Volume Set (Child Lun)	Volume State	Capacity
Raid Set #00	C005 C006 C007 C008	Volume Set #00 (0.0%)	Migration(10.5%)	160.0 GB

Channel	Usage	Capacity	Model
C001	N.A.	N.A.	N.A.
C002	N.A.	N.A.	N.A.
C003	N.A.	N.A.	N.A.
C004	N.A.	N.A.	N.A.
<b>C005</b>	Raid Set #00	30.0 GB	ST380013AS
<b>C006</b>	Raid Set #00	30.0 GB	ST380013AS
<b>C007</b>	Raid Set #00	30.0 GB	ST380013AS
<b>C008</b>	Raid Set #00	30.0 GB	ST380013AS

## 6.7.4 Check Volume Set

To check a volume set from a raid set:

- (1). Click on the Check Volume Set link.
- (2). Tick on the volume set from the list that you wish to check. Tick on Confirm The Operation and click on the Submit button. Use this option to verify the correctness of the redundant data in a volume set. For example, in a system with dedicated parity, volume set check means computing the parity of the data disk drives and comparing the results to the contents of the dedicated parity disk drive. The checking percentage can also be viewed by clicking on RaidSet Hierarchy in the main menu.

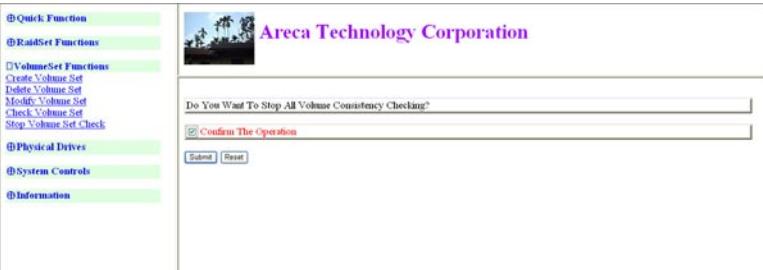
# WEB BROWSER-BASED CONFIGURATION



The screenshot shows a web-based configuration interface for Areca Technology Corporation. The left sidebar contains a navigation menu with the following items: Quick Function, RaidSet Functions, VolumeSet Functions (Create Volume Set, Delete Volume Set, Modify Volume Set, Check Volume Set, Stop Volume Set Check), Physical Drives, System Controls, and Information. The main content area has a header 'Area Technology Corporation' with a logo. Below the header is a section titled 'Select The Volume Set To Be Checked' with a table. The table has columns for 'Select', 'Volume Set Name', 'On Raid Set', and 'Capacity'. A radio button is selected next to 'Volume Set # 00', with 'Raid Set # 00' and '160.0 GB' displayed. Below the table is a checkbox labeled 'Confirm The Operation'. At the bottom of the form are 'Submit' and 'Reset' buttons.

## 6.7.5 Stop VolumeSet Check

Use this option to stop the Check Volume Set function.



The screenshot shows a confirmation dialog box on the web-based configuration interface. The left sidebar is identical to the previous screenshot. The main content area has a header 'Area Technology Corporation' with a logo. Below the header is a question 'Do You Want To Stop All Volume Consistency Checking?'. Below the question is a checkbox labeled 'Confirm The Operation'. At the bottom of the dialog are 'Submit' and 'Reset' buttons.

## 6.8 Physical Drive

Choose this option from the Main Menu to select a physical disk and to perform the operations listed below.

### 6.8.1 Create Pass-Through Disk

To create pass-through disk, move the mouse cursor to the main menu and click on the Create Pass-Through link. The relative setting function screen appears.

Disk is no controlled by the SATA RAID controller firmware and thus cannot be a part of a volume set. The disk is available to the operating system as an individual disk. It is typically used on a system where the operating system is on a disk not controlled by the RAID firmware. User can also select the cache mode, Tagged Command Queuing, SCSI channel/SCSI\_ID/SCSI\_LUN for this volume.

# WEB BROWSER-BASED CONFIGURATION

Areca Technology Corporation

Select the IDE drive For Pass Through

Select	Channel	Capacity	Model
<input checked="" type="radio"/>	IDE Ch06	30.00GB	ST300013AS
<input type="radio"/>	IDE Ch07	30.00GB	ST300013AS
<input type="radio"/>	IDE Ch08	30.00GB	ST300013AS

Enter Pass Through Disk Attribute

Volume Cache Mode: Write Back

Tagged Command Queuing: Enabled

SCSI Channel/SCSI\_ID/SCSI\_Lun: 0:0:0

Confirm The Operation

## 6.8.2 Modify Pass-Through Disk

Use this option to modify the Pass-Through Disk Attribute. User can modify the cache mode, Tagged Command Queuing, and SCSI channel/ID/LUN on an existed pass through disk.

To modify the pass-through drive attribute from the pass-through drive pool, move the mouse cursor bar to click on Modify Pass-Through link. The Select The Pass Through Disk For Modification screen appears tick on the Pass-Through Disk from the pass-through drive pool and click on the Submit button to select drive. The Enter Pass-Through Disk Attribute screen appears, modify the drive attribute values, as you want.

Areca Technology Corporation

Enter Pass Through Disk Attribute

Ch06 30.00GB ST300013AS
-------------------------

Volume Cache Mode: Write Back

Tagged Command Queuing: Enabled

SCSI Channel/SCSI\_ID/SCSI\_Lun: 0:0:0

Confirm The Operation

After you complete the selection, tick on the Confirm The Operation and click on the Submit button to complete the selection action.

# WEB BROWSER-BASED CONFIGURATION

## 6.8.3 Delete Pass-Through Disk

To delete pass-through drive from the pass-through drive pool, move the mouse cursor bar to the main menus and click on Delete Pass Through link.



Select	Channel	Capacity	Model
<input checked="" type="radio"/>	IDE Ch06	30.0GB	ST300013AS

After you complete the selection, tick on the Confirm The Operation and click on the Submit button to complete the delete action.

## 6.8.4 Identify Selected Drive

To prevent removing the wrong drive, the selected disk LED will light for physically locating the selected disk when the Identify Selected Drive is selected.

To identify the selected drive from the drives pool, move the mouse cursor bar to click on Identify Selected Drive link. The Select The IDE Device For identification screen appears tick on the IDE device from the drives pool and Flash method. After completing the selection, click on the Submit button to identify selected drive.



Select	Channel	Capacity	Model
<input checked="" type="checkbox"/>	IDE Ch05	30.0GB	ST300013AS
<input type="checkbox"/>	IDE Ch06	30.0GB	ST300013AS
<input type="checkbox"/>	IDE Ch07	30.0GB	ST300013AS
<input type="checkbox"/>	IDE Ch08	30.0GB	ST300013AS

# WEB BROWSER-BASED CONFIGURATION

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## 6.9 System Controls

### 6.9.1 System Config

To set the raid system function, move the cursor bar to the main menu and click on the Raid System Function link. The Raid System Function menu will show all items. Move the cursor bar to an item, then press Enter key to select the desired function.

- **System Beeper Setting**

The Alert Beeper function item is used to Disabled or Enable the SATA RAID controller alarm tone generator.

- **Background Task Priority**

The Raid Rebuild Priority is a relative indication of how much time the controller devotes to a rebuild operation. The SATA RAID controller allows user to choose the rebuild priority (ultraLow, Low, Normal, High) to balance volume set access and rebuild tasks appropriately. For high array performance, specify a Low value.

- **JBOD/RAID Configuration**

JBOD is an acronym for “**just a Bunch Of Disk**”. It represents a volume set that is created by the concatenation of partitions on the disk. It can see all 8 disks, when you selected the JBOD option. User needs to deleted the RAID set, when you want to change the option from the RAID to the JBOD function.

- **Maximum SATA Mode Supported**

The Controller can support up to SATA II, which runs up to 300MB/s. NCQ is a command protocol in Serial ATA that can only be implemented on native Serial ATA hard drives. It allows multiple commands to be outstanding within a drive at the same time. Drives that support NCQ have an internal queue where outstanding commands can be dynamically rescheduled or re-ordered, along with the necessary tracking mechanisms for outstanding and completed portions of the workload. The RAID subsystem allows user to choose the SATA Mode: SATA150, SAT150+NCQ, SAT300, SATA300+NCQ.

- **Write Disk Cache Mode**

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# WEB BROWSER-BASED CONFIGURATION

User can set the “Disk Write Cache Mode” to: Auto, Enabled or Disabled.

## ● Disk Capacity Truncation Mode:

ARECA RAID controllers use drive truncation so that drives from differing vendors are more likely to be able to be used as spares for each other. Drive truncation slightly decreases the usable capacity of a drive that is used in redundant units.

The controller provides three truncation modes in the system configuration: **Multiples Of 10G**, **Multiples Of 1G**, and **No Truncation**.

**Multiples Of 10G:** If you have 120 GB drives from different vendors; chances are that the capacity varies slightly. For example, one drive might be 123.5 GB, and the other 120 GB. Areca drive Truncation mode **Multiples Of 10G** uses the same capacity for both of these drives so that one could replace the other.

**Multiples Of 1G:** If you have 123 GB drives from different vendors; chances are that the capacity varies slightly. For example, one drive might be 123.5 GB, and the other 123.4 GB. Areca drive Truncation mode **Multiples Of 1G** uses the same capacity for both of these drives so that one could replace the other.

**No Truncation:** It does not truncate the capacity.



## 6.9.2 Ethernet Configuration (12/16/24 ports)

Use this feature to set the controller Ethernet port configuration. Customer doesn't need to create a reserved space on the arrays before the Ethernet port and HTTP service working. The firmware-embedded Web Browser-based RAID manager can access it from any standard internet browser or from any host computer either

# WEB BROWSER-BASED CONFIGURATION

directly connected or via a LAN or WAN with no software or patches required.

DHCP (Dynamic Host Configuration Protocol) is a protocol that lets network administrators manage centrally and automate the assignment of IP (Internet Protocol) configurations on a computer network. When using the Internet's set of protocols (TCP/IP), in order for a computer system to communicate to another computer system it needs a unique IP address. Without DHCP, the IP address must be entered manually at each computer system. DHCP lets a network administrator supervise and distribute IP addresses from a central point. The purpose of DHCP is to provide the automatic (dynamic) allocation of IP client configurations for a specific time period (called a lease period) and to eliminate the work necessary to administer a large IP network.

To configure the raid controller EtherNet port, move the cursor bar to the main menu and click on the System Controls link. The System Controls menu will show all items. Move the cursor bar to the EtherNet Config item, then press **Enter** key to select the desired function.

Local IP Address (Used If DHCP Disabled)	192	168	1	100		
Gateway IP Address (Used If DHCP Disabled)	192	168	1	1		
Subnet Mask (Used If DHCP Disabled)	255	255	255	0		
HTTP Port Number (7168-8191 Is Reserve)	80					
Ticket Port Number (7168-8191 Is Reserve)	23					
Current IP Address	192	168	0	114		
Current Gateway IP Address	192	168	0	1		
Current Subnet Mask	255	255	255	0		
EtherNet MAC Address	00	04	D9	70	00	24

## 6.9.3 Alert by Mail Configuration (12/16/24 ports)

To configure the raid controller email function, move the cursor bar to the main menu and click on the System Controls link. The System Controls menu will show all items. Move the cursor bar to the Alert By Mail Config item, then press Enter key to select the desired function. This function can only set by the web-based configuration.

The firmware contains SMTP manager monitors all system events

# WEB BROWSER-BASED CONFIGURATION

and user can select either single or multiple user notifications to be sent via "Plain English" e-mails with no software required.



The screenshot shows a web-based configuration interface for Area Technology Corporation. The left sidebar lists various functions: Quick Function, RaidNet Functions, VolumeNet Functions, Physical Drives, System Controls, System Code, ErrorLog Code, Alert Log Code, **SNMP Configuration**, View Events/Logs Report, Generate Test Event, Clear Event Buffer, Modify Password, and Upgrade Firmware. The **Information** section is also visible. The main content area is titled "Area Technology Corporation" and shows the "SMTP Server Configuration" page. It includes fields for "SMTP Server IP Address" (with a placeholder of 0.0.0.0) and "Mail Address Configurations" (with four rows for "Sender Name" and "Mail Address", and "Account" and "Password"). Below this is the "Event Notification Configurations" section, which includes radio buttons for "Double Event Notification", "Urgent Error Notification", "Serious Error Notification", "Warning Error Notification", "Information Notification", and a checkbox for "Notification For No Event". The "No Event Notification Will Be Sent" section lists options: "Send Only Urgent Event", "Send Urgent And Serious Event", "Send Urgent, Serious And Warning Event", and "Send All Event". A "Notify User If No Event Occurs Within 24 Hours" checkbox is also present. At the bottom are "Confirm The Operation", "Submit", and "Reset" buttons.

## 6.9.4 SNMP Configuration

To configure the raid controller SNMP function, move the cursor bar to the main menu and click on the System Controls link. The System Controls menu will show all items. Move the cursor bar to the SNMP Configuration item, then press Enter key to select the desired function. This function can only set by the web-based configuration.

The firmware contains SNMP Agent manager monitors all system events and user can use the SNMP function from the web setting with no Agent software required.



The screenshot shows a web-based configuration interface for Area Technology Corporation. The left sidebar lists various functions: Quick Function, RaidNet Functions, VolumeNet Functions, Physical Drives, System Controls, System Code, ErrorLog Code, Alert Log Code, **SNMP Configuration**, View Events/Logs Report, Generate Test Event, Clear Event Buffer, Modify Password, and Upgrade Firmware. The **Information** section is also visible. The main content area is titled "Area Technology Corporation" and shows the "SNMP Trap Configuration" page. It includes fields for "SNMP Trap IP Address #1", "SNMP Trap IP Address #2", and "SNMP Trap IP Address #3", each with a placeholder of 0.0.0.0 and a "Port" field set to 162. Below this is the "SNMP System Configurations" section, which includes fields for "Community" (with a placeholder of public), "sysContact 0", "sysName 0", and "sysLocation 0". The "SNMP Trap Notification Configurations" section includes radio buttons for "Double SNMP Trap", "Serious Error Notification", "Error Notification", "Warning Notification", and "Information Notification", and a "No SNMP Trap Will Be Sent" section with options: "Send Only Serious Event", "Send Serious And Error Event", "Send Serious, Error And Warning Event", and "Send All Event". At the bottom are "Confirm The Operation", "Submit", and "Reset" buttons.

# WEB BROWSER-BASED CONFIGURATION

## 6.9.5 View Events/Mute Beeper

To view the SATA RAID controller's information, move the mouse cursor to the main menu and click on the System Information link. The SATA Raid controller events Information screen appears. Choose this option to view the system events information: Timer, Device, Event type, Elapse Time and Errors. The RAID system does not built the real time clock. The Time information is the relative time from the SATA RAID controller power on.



The screenshot shows a web-based configuration interface for a RAID controller. The left sidebar has a green header with the following menu items: Quick Function, RaidSet Functions, VolumeSet Functions, Physical Drives, System Controls (with 'View Events/Mute Beeper' highlighted in red), and Information. The main content area has a header 'Areca Technology Corporation' with a logo. Below it is a table titled 'System Events Information' with the following data:

Time	Device	Event Type	Elapse Time	Errors
2005-2-12 21:19:35	Volume Set #01	Complete Rebuild	010:23:32	
2005-2-1 12:56:3	Volume Set #02	Start Rebuilding		
2005-2-1 12:56:3	Volume Set #01	Complete Rebuild	005:39:37	
2005-2-1 17:16:26	Volume Set #01	Start Rebuilding		
2005-2-1 17:16:25	Volume Set #00	Complete Rebuild	009:00:57	
2005-1-31 22:15:28	Volume Set #00	Start Rebuilding		
2005-1-31 22:15:25	Raid Set #00	Rebuild RaidSet		
2005-1-31 22:15:25	IDB Channel 14	Device Inserted		
2005-1-31 22:15:16	IDB Channel 14	Device Removed		
2005-1-31 22:14:58	IDB Channel 14	Device Failed		
2005-1-31 22:14:57	Raid Set #00	RaidSet Degraded		
2005-1-31 22:14:57	Volume Set #02	Volume Degraded		
2005-1-31 22:14:57	Volume Set #01	Volume Degraded		
2005-1-31 22:14:57	Volume Set #00	Volume Degraded		
2005-1-31 21:48:3	IDB Channel 14	Reading Error		
2005-1-31 16:17:53	IDB Channel 2	Reading Error		

At the bottom of the table is a 'Next Page' button.

## 6.9.6 Generate Test Event

Use this feature is to view test events.



The screenshot shows a web-based configuration interface for a RAID controller. The left sidebar has a green header with the following menu items: Quick Function, RaidSet Functions, VolumeSet Functions, Physical Drives, System Controls (with 'Generate Test Event' highlighted in red), and Information. The main content area has a header 'Areca Technology Corporation' with a logo. Below it is a form with the following text:  
Do You Want To Generate Test Event?  
 Confirm The Operation  
Submit    Reset

## 6.9.7 Clear Events Buffer

Use this feature to clear the entire events buffer information.

# WEB BROWSER-BASED CONFIGURATION



## 6.9.8 Modify Password

To set or change the SATA RAID controller password, move the mouse cursor to Raid System Function screen, and click on the Change Password link. The Modify System Password screen appears.

The password option allows user to set or clear the SATA RAID controller's password protection feature. Once the password has been set, the user can only monitor and configure the SATA RAID controller by providing the correct password.



The password is used to protect the SATA RAID controller from unauthorized entry. The controller will check the password only when entering the Main menu from the initial screen. The SATA RAID controller will automatically go back to the initial screen when it does not receive any command in ten seconds.

To disable the password, press Enter key only in both the Enter New Password and Re-Enter New Password column. Once the user confirms the operation and clicks the Submit button. The existing password will be cleared. No password checking will occur when entering the main menu from the starting screen.

# WEB BROWSER-BASED CONFIGURATION

## 6.9.9 Update Firmware

Please reference the appendix A firmware utility.



## 6.10 Information

### 6.10.1 RaidSet Hierarchy

Use this feature to view the SATA RAID controller current raid set, current volume set and physical disk configuration. Please reference the this chapter **“Configuring Raid Sets and Volume Sets”**



### 6.10.2 System Information

To view the SATA RAID controller's information, move the mouse cursor to the main menu and click on the System Information

# WEB BROWSER-BASED CONFIGURATION

link. The SATA RAID controller Information screen appears.

Use this feature to view the SATA RAID controller's information. The controller name, firmware version, serial number, main processor, CPU data/Instruction cache size and system memory size/speed appear in this screen.

RAID Subsystem Information	
Controller Name	ARC-1260
Firmware Version	V1.35 2004-12-31
Boot ROM Version	V1.35 2004-12-31
Serial Number	D0112AC156GE001
Main Processor	500MHz 32P332
CPU L1Cache Size	32Kbytes
CPU L2Cache Size	32Kbytes / Write Back
System Memory	256MB / 333MHz
Current IP Address	192.168.0.114

## 6.10.3 Hardware Monitor

To view the RAID controller's hardware monitor information, move the mouse cursor to the main menu and click the Hardware Monitor link. The Hardware Information screen appears.

The Hardware Monitor Information provides the temperature, and fan speed (I/O Processor fan) of the PCI SATA RAID controller.

Hardware Monitor Information	
Fan Speed	2178 RPM
Battery Status	Not installed
H56#01 Temperature	30 °C
H56#02 Temperature	28 °C
H56#03 Temperature	30 °C
H56#04 Temperature	35 °C
H56#05 Temperature	35 °C
H56#06 Temperature	34 °C
H56#07 Temperature	31 °C
H56#08 Temperature	35 °C
H56#09 Temperature	31 °C
H56#10 Temperature	35 °C
H56#11 Temperature	37 °C
H56#12 Temperature	39 °C
H56#13 Temperature	37 °C
H56#14 Temperature	30 °C
H56#15 Temperature	30 °C
H56#16 Temperature	33 °C

## Appendix A

Since the SATA RAID controller features flash firmware, it is not necessary to change the hardware flash chip in order to upgrade the RAID firmware. The user can simply re-program the old firmware and BIOS through the McRAID storage manager. New releases of the Firmware and BIOS are available in the form of a DOS file at web site. The file available at the web site is usually a self-extracting file that contains the following:

1XXXFIRMVVV.BIN Firmware Binary (where "1XXX" refers to the model name and "VVV" refers to the firmware version)  
1XXXBIOSVVV.BIN BIOS Binary (where "1XXX" refers to the model name and "VVV" refers to the firmware version)  
README.TXT It contains the history information of the firmware change. Read this file first before upgrading the firmware.  
These files must be extracted from the compressed file and copied to one directory in drive A: or C:.

## Upgrading Firmware Through McRAID Storage Manager

Get the new version firmware for your SATA RAID controller. For Example, download the bin file from your OEM's web site onto the C:

1. To upgrade the SATA RAID controller firmware, move the mouse cursor to "**Upgrade Firmware**" link. The "**Upgrade The Raid System Firmware**" screen appears.
2. Click **Browse**. Look in the location where the Firmware upgrade software is located. Select the File name click "**Open**".
3. Click the "**Confirm The Operation**" and press the "**Submit**" button.
4. The Web Browser begins to download the firmware binary to the controller and start to update the flash ROM.

# APPENDIX

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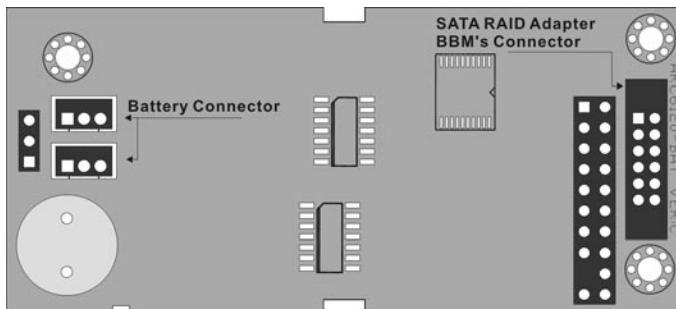
5. After the firmware upgrade is complete, a bar indicator will show "**Firmware Has Been Updated Successfully**"
6. After the new firmware completes download, user should find a chance to restart the controller for the new firmware to take effect.

## Appendix B

### Battery Backup Module (BBM)

The SATA RAID controller operates using cache memory .The battery Backup Module is an add-on module that provides power to the PCI SATA RAID controller cache memory in the event of a power failure. The Battery Backup Module monitors the write back cache on the SATA RAID controller, and provides power to the cache memory if it contains data not yet written to the hard drives when power failure occurs.

#### BBM Components



#### BBM Specifications

##### Mechanical

- Module Dimension (W x H x D)  
40 x 22 x 85 mm
- BBM Connector  
2 \* 6 box header

##### Environmental

- Operating Temperature  
Temperature: +5° C to +40° C
- Humidity: 45-85%, non-condensing
- Storage Temperature  
Temperature: -40° C to 60° C

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- Humidity: 45-85%, non-condensing

Electrical

- Input Voltage  
+3.6VDC
- On Board Battery Capacity  
1000mAH (1\*1000mAH)

## Installation

1. Make sure all power to the system is disconnected.
2. Connector J2 is available for the optional battery backup module. Connect the BBM cable to the 12-pin battery connector on the controller
3. Integrators may provide pre-drilled holes in their cabinet for securing the BBM using its three mounting positions.

## Battery Backup Capacity

Battery backup capacity is defined as the maximum duration of a power failure for which data in the cache memory can be maintained by the battery. The BBM's backup capacity varied with the memory chips that installed on the SATA RAID controller.

Capacity	Memory Type	Battery Backup duration (Hours)
128MB DDR	Low Power (18mA)	56

## Operation

1. Battery conditioning is automatic. There are no manual procedures for battery conditioning or preconditioning to be performed by the user.
2. Battery has a tendency to “remember” its capacity. In order to make sure of all the capacity of your battery cells, allow the battery cell to be fully charged when installed for the first time. The first time charge of battery cells takes about 24 hours to complete.

## Changing the Battery Backup Module

The LI-ION battery will no longer accept a charge properly. LI-ION battery life expectancy is approximately 1 to 5 years.

1. Shutdown the operating system properly. Make sure that cache memory has been flushed.
2. Disconnect the battery backup module cable from J2 on the SATA RAID card.
3. Disconnect the battery pack cable from JP2 on the Battery Backup Module.
4. Install a new battery pack and connect the new battery pack to JP2.
5. Connect the Battery Backup Module to J2 on the SATA card.
6. Disable the write-back function from the BIOS or Utility.

**Note:**

The BBM can not work in the mainboard which turn off the PCI-x/pci-exprss clock in the beginning stage of power failure.

## Appendix C

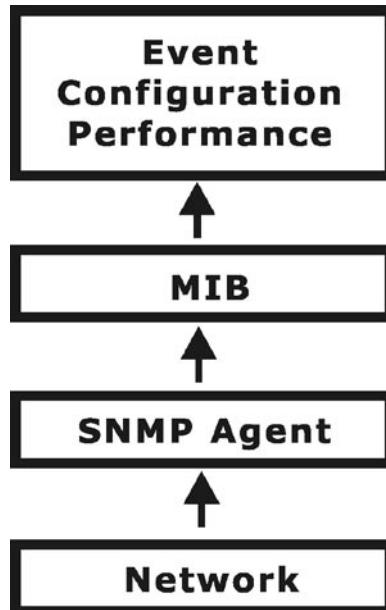
### SNMP Operation & Definition

#### Overview

The McRAID manager includes a firmware-embedded Simple Network Management Protocol (SNMP) agent for the connect SATA RAID controller. An SNMP-based management application (also known as an SNMP manager) can monitor the SATA RAID controller. An example of a SNMP management application is Hewlett-Packard's Open View. The firmware-embedded SNMP agent can be used to augment the SATA RAID controller if you are already running SNMP management application at your site.

#### SNMP Definition

SNMP, an IP-based protocol, has a set of commands for getting the status of target devices. The SNMP management platform is called the SNMP manager, and the managed devices have the SNMP agent loaded. Management data is organized in a hierarchical data structure called the management Information Base (MIB). These MIBs are defined and sanctioned by various industry associations. The objective is for all vendors to create products in compliance with these MIBs so that inter-vendor interoperability can be achieved. If a vendor wishes to include additional device information that is not specified in a standard MIB, then that is usually done through MIB extensions.



## SNMP Installation

The installation of the SNMP manager is accomplished in several phases:

- Installing the Manager software on the client
- Placing a copy of the management information base (MIB) in a directory which is accessible to the management application
- Compiling the MIB description file with the management application

## Starting the SNMP function setting

① Quick Function  
② RaidSet Functions  
③ VolumeSet Functions  
④ Physical Drives  
⑤ System Controls  
System Config  
SNMP Configuration  
View Events/Mote Keeper  
Generate Test Event  
Clear Event Buffer  
Module Management  
Upgrade Firmware  
⑥ Information

Area Technology Corporation

SNMP Community Configuration

Community:

Confirm The Operation

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## • Community Name

Community name act as password of screen accesses to the SNMP agent of a particular network device. Type in the community names of the SNMP agent. Before access is granted to a request station, this station must incorporate a valid community names to its request; otherwise, the SNMP agent will deny access to the system.

Most network devices use “public” as default of their community names. This value is case-sensitive.

## **MIB Compilation and Definition File creation**

Before the manager application accesses the RAID controller, user needs to integrate the MIB into the management application’s database of events and status indicator codes. This process is known as compiling the MIB into the application. This process is highly vendor-specific and should be well-covered in the User’s Guide of your SNMP application. Ensure the compilation process successfully integrates the contents of the ARECARAID.MIB file into the traps database.

## **Location for MIB**

Depending upon the SNMP management application used, the MIB must be placed in a specific directory on the network management station running the management application. The MIB file must be manually copied to this directory. For example:

SNMP Management Application	MIB Location
HP OpenView	\OV\MIBS
Netware NMS	\NMS\SNMPMIBS\CURRENT

Your management application may have a different target directory. Consult the management application’s user manual for the correct location.

## Appendix D

### General Troubleshooting Tips

Most of controller errors are traceable to external factors, such as conflicts with other installed cards, bad or incorrectly configured drives, loose cables, improper controller installation, or other installation errors.

To troubleshoot SATA RAID controller problems, try simplifying your hardware configuration by removing some other devices from the system and then adding them back one at a time.

Look for the latest information on SATA RAID Controllers as well as the newest drivers on the ARECA web site at <http://www.areca.com.tw>. The following general guidelines are for some specific error conditions:

#### **Question 1:**

**The BIOS Message of the SATA RAID controller never appears on the screen:**

Answer:

- (1). Ensure the controller is inserted correctly into the PCI slot.
- (2). Ensure 3.3 volts are being supplied to the PCI slot.
- (3). Check the cabling between the SATA drives or enclosure the SATA RAID controller.

#### **Question 2:**

**How many SATA RAID controllers can be installed into a computer system?**

Answer:

Up to 4 RAID controllers in a system are supported.

#### **Question 3:**

**The boot device cannot found**

Answer:

Enter the system BIOS setup utility Per manufacture directions and configure it so that the volume set is once again selected as the

# APPENDIX

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primary boot device (or first in the boot device list)

## **Question 4:**

**What PCI slots are supported by the SATA RAID controllers?**

Answer:

For all PCI-X SATA RAID controllers, install card in a 64-bit/133MHz PCI-X for the best performance. It can also be used in 64-bit / 66 MHz slots, 32-bit/66MHz PCI slots as well as 32-bit/33MHz slots. All PCI-X SATA RAID controllers can not work with 5V PCI slot.

## **Question 5:**

**What is the difference between RAID 6 and RAID 5?**

Answer:

RAID 6 allows two drives to fail simultaneously without downtime or data loss. However, RAID 5 only allows one drive to fail. RAID 6 thus provides a much higher level of fault tolerance than RAID 5. It is a perfect solution when data is mission-critical.

Due to this higher level of protection, users can set up larger RAID volumes, spanning up to 56 physical drives. With ARECA RAID 6 engine. RAID 6 and RAID 5 have similar performance in the SATA RAID controller

## **Question 6:**

**What products support RAID 6?**

Answer:

RAID 6 is available with controller model with RAID 6 engine installed

## **Question 7:**

**What operating systems are supported?**

Answer:

The SATA RAID controllers support Microsoft® Windows® Server 2003, Windows XP, Windows 2000, Red Hat Linux, SuSE Linux, and FreeBSD. For specific OS versions, see [www.areca.com.tw](http://www.areca.com.tw) for more information.

**Question 8:**

**Will ARECA submit the Linux code to kernel.org?**

Answer:

Yes. Shortly after we ship products, we will submit our code.

**Question 9:**

**What is the warranty period?**

Answer:

Like all ARECA External RAID controllers, the PCI-X or PCI-Express SATA RAID controller is backed by a 3-year warranty.

**Question 10:**

**Which O/S (Operating System) will support X86 64-bit processors?**

Answer:

The following O/S vendors have announced product support for AMD64 and Intel EM64T. Contact each vendor for more details. The following is our currently supported OS and version for 64-bit processor. We will support others shortly after other versions release.

**Microsoft:**

Production support will be available in:

- Windows XP Professional x64 Edition
- Windows Server 2003 64-Bit Edition

**Red Hat:**

Production support will be available in:

- Red Hat Enterprise Linux 3 update 2

**SuSE:**

Production support will be available in:

- SLES9

**FreeBSD:**

Production support will be available in:

- FreeBSD 5.3

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## Question 11:

**Is it possible to write software that will run on Intel's processors with Intel® EM64T, and AMD's 64-bit capable processors?**

Answer:

Yes, in most cases. Even though the hardware microarchitecture for each company's processor is different, the operating system and software ported to one processor will likely run on the other processor due to the close similarity of the instruction set architectures. However, Intel processors support additional features, like the SSE3 instructions and Hyper-Threading Technology, which are not supported on non-Intel platforms. As such, we believe developers will achieve maximum performance and stability by designing specifically for Intel architectures and by taking advantage of Intel's breadth of software tools and enabling services.

## Question 12:

**How will Intel® EM64T work and what software is there to take advantage of 64-bit extensions?**

Answer:

Platforms with Intel® EM64T/AMD64 can be run in three basic ways (note: a 64-bit capable BIOS is required for all three scenarios):

1. 32-bit O/S and 32-bit applications (Legacy Mode): No software changes are required, however the user gets no benefit from Intel® EM64T or AMD64;
2. 64-bit O/S and 32-bit applications (Compatibility Mode): This usage requires all 64-bit device drivers. In this mode, the O/S will see the 64-bit extensions, but the 32-bit application will not. Existing 32-bit applications do not need to be recompiled, and may or may not benefit from the 64-bit extensions. The application will likely need to be recertified by the vendor to run on the new 64-bit extended O/S.
3. 64-bit O/S and 64-bit applications (64-bit Mode): This usage requires 64-bit device drivers. It also requires applications to be modified for 64-bit operation and then recompiled and validated.

## Appendix E

### Technical Support

Areca Technical Support provides several options for Areca users to access information and updates. We encourage you to use one of our electric services, which provide product information updates for the most efficient service and support. If you decide to contact us, please have the information such as Product model and serial number, BIOS and driver version, and a description of the problem.

# **GLOSSARY**

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## **Glossary**

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### **2TB**

The 32-bit versions operating systems have a maximum limitation of 2 TB per volume set. 64-bit versions remove this limitation, so if you are building large warehouses, you should consider 64-bit versions.

### **Array**

An array is a logical disk comprised of multiple physical hard disks. The number of hard disks in an array is dictated by the type of the array and the number of spares that may be assigned to it. (Arrays are also sometimes referred to as containers). Furthermore, whether an array can be built using part of the space on a disk (as opposed to being forced to use the whole disk) depends upon the implementation. Arrays are typically used to provide data redundancy and/or enhanced I/O performance.

### **ATA**

Acronym for **“AT Bus Attachment”** - a standard interface to IDE hard disks. Western Digital’s IDE disk interface was standardized by ANSI to form the ATA specification using a 16-bit ISA bus.

### **Auto Reassign Sector**

SATA drives perform automatic defect re-assignment for both read and write errors. Writes are always completed - if a location to be written is found to be defective, the drive will automatically relocate that write command to a new location and map out the defective location. If there is a recoverable read error, the correct data will be transferred to the host and that location will be tested by the drive to be certain the location is not defective - if it is found to have a defect, it will be automatically relocated to a new location and the defective location mapped out. In the event of an unrecoverable read error, the error will be reported to the host and the location flagged as potentially defective. A subsequent write to that location will initiate a sector test and relocation should that location have a defect.

## **Battery Backup Module**

Many modern RAID controllers are armed with a battery backup Module (BBM). While an UPS protects most servers from power fluctuations or failures, a BBM provides an additional level of protection. In the event of a power failure, a BBM supplies power to retain data in the RAID controller's cache, thereby permitting any potentially dirty data in the cache to be flushed out to secondary storage when power is restored.

## **BIOS**

(Basic Input/Output System) software is stored on a chip and provides an interface between the operating system and the hardware. Usually the BIOS is built into a ROM chip installed on the motherboard so that the BIOS will always available and not affected by disk failure.

## **Cache**

Controller memory used to speed up data transfer to and from a disk.

## **Consistency Check**

In RAID, check consistency verifies the correctness of redundant data in an array. For example, in a system with dedicated parity, checking consistency means computing the parity of the data drives and comparing the results to the contents of the dedicated parity drive.

## **Driver**

It is a piece of software – that is often executed in kernel mode – that controls a hardware device. Typically drivers provide an interface by which applications can use the device in a uniform and hardware-independent manner.

### **Hot Spare**

An extra physical disk drive in a RAID configuration that controller can use to automatically rebuild a system drive when another drive fails. The hot spare drive must have at least as much capacity as the largest disk drive in the array or the rebuild may not start.

# **GLOSSARY**

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## **Hot Spare**

An extra physical disk drive in a RAID configuration that controller can use to automatically rebuild a system drive when another drive fails. The hot spare drive must have at least as much capacity as the largest disk drive in the array or the rebuild may not start.

## **Hardware RAID versus Software RAID**

Beyond the different types of RAID, there are two implementation forms: hardware-based and software-based. Hardware-based RAID is obviously implemented at a physical level, whereas software-based RAID is done after you start using the operating system. It is always optimal to have RAID done at a physical level.

## **Hot Swap**

To pull out a component from a system and plug in a new one while the power is still on and the unit is still operating.

## **NVRAM**

(Non-Volatile Random Access Memory) A memory unit is equipped with a battery so that the data remain even after the main power had been switched off. Actually an EEPROM used to store configuration information.

## **Parity**

A technique used to protect a system from data loss due to faults. When parity is implemented (RAID3 and RAID5), data written is logically XOR'd together to calculate parity, which is stored on the drives along with the data. In a system with three drives, the data is written to two drives and the calculated parity is stored on a third drive. If one drive fails, data on the failed drive is reconstructed from other data and parity.

## **PCI Express**

An advanced version of the PCI bus introduced in 2002. Rather than the shared, parallel bus structure of PCI, PCI Express provides a high-

speed, switched architecture. Each PCI Express link is a serial communications channel made up of two differential wire pairs that provide 2.5 Gbits/sec in each direction. Up to 32 channels may be combined, creating a parallel interface of independently controlled serial links.

## **PCI-X**

(PCI eXtended) an enhanced PCI bus technology is backward compatible with existing PCI cards. PCI and PCI-X slots are physically the same. PCI cards run in PCI-X slots, and PCI-X cards run in PCI slots at the slower PCI rates. First introduced in 1999, PCI-X offered increased speed over PCI and has steadily increased to more than 30 times that of the original PCI bus. For a comparison of all PCI technologies.

## **RAID**

(Redundant Array of Independent Disks) a disk subsystem that is used to increase performance or provide fault tolerance. RAID can also be set up to provide both functions at the same time. RAID is a set of two or more ordinary hard disks and a specialized disk controller that contains the RAID functionality. RAID has been developed initially for servers and stand-alone disk storage systems. RAID is important especially when rebuilding data after a disk failure.

## **Rebuild**

When a RAID array enters into a degraded mode, it is advisable to rebuild the array and return it to its original configuration (in terms of the number and state of working disks) to ensure against operation in degraded mode.

## **SATA (Serial ATA)**

The evolution of the ATA (IDE) interface that changes the physical architecture from parallel to serial and from master-slave to point-to-point. Unlike parallel ATA interfaces that connect two drives; one configured as master, the other as slave, each Serial ATA drive is connected to its own interface. At initial introduction, Serial ATA (SATA) increases the transfer rate to 150 MB/sec (1.5Gb/s).

# **GLOSSARY**

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## **SMART**

This technology provides users with advanced warning of Disk Drive failures thus enabling the Operating System to warn Users of potential failure. S.M.A.R.T. was included in EIDE drives with the ATA-3 specification.

## **SNMP**

Since it was developed in 1988, the Simple Network Management Protocol has become the de facto standard for inter-network management. Because it is a simple solution, requiring little code to implement, vendors can easily build SNMP agents to their products. SNMP is extensible, allowing vendors to easily add network management functions to their existing products. SNMP also separates the management architecture from the architecture of the hardware devices, which broadens the base of multi-vendor support.

## **Volume Set**

A volume set is a concatenation of storage elements that may be RAID arrays, JBODs, or simply areas of disks that are not part of RAID arrays.

## **Write-back**

When a cache is operating in write-back mode, data written into the cache is not immediately written out to its destination in secondary storage unless the heuristics governing the flushing of dirty data demands otherwise. This methodology can improve the efficiency of write operations under favorable circumstances. However, its use can potentially lead to incoherencies in a system that is not protected from power fluctuations or failures.

## **Write-through**

When a cache is operating in write-through mode, data written into the cache is also written to the destination secondary storage devices. Essentially write completion does not occur until the data is written to secondary storage. Thus the contents of the cache and the secondary storage are always consistent. The advantage is that the possibility of data corruption is greatly reduced. The disadvantage is that write-

through operations are more time consuming.

## **XOR-Engine**

All RAID arrays (with the exception of RAID 0, RAID 1 and RAID 10) require parity to be calculated and written to the array in conjunction with data. Typically the parity is a simple XOR on the bytes comprising a stripe. This is a computationally intensive operation that many modern RAID controllers perform using a dedicated ASIC (instead of calculating them in firmware on the main embedded processor's core). This dedicated ASIC is often referred to as a XOR-engine.